PRE-ALGEBRA REVIEW PACKETS & QUIZZES

Packet 1 (The Real Numbers)

- Exponents, Negative Exponents, Zero Exponent
- Perfect Squares & Square Roots
- Perfect Cubes & Cube Roots
- Scientific Notation vs. Standard Form
- Classifying the Real Numbers
- Comparing & Ordering Numbers (written in various forms)
- Order of Operations
- Evaluating Expressions
- Properties

Quiz 1

Packet 2 (Expressions, Equations, & Inequalities)

- Translating Expressions
- Simplifying Expressions (Distribute and/or Combine Like Terms)
- Factoring Expressions (Finding the Greatest Common Factor)
- Solving Two-Step & Multi-Step Equations
- Equations with Special Solutions
- Translating Equations
- Equation Word Problems
- Solving Two-Step & Multi-Step Inequalities
- Graphing Inequalities
- Translating Inequalities
- Inequality Word Problems

Quiz 2

Packet 3 (Exponent Rules & Scientific Notation)

- *Multiplying Monomials (Product Rule)
- *Dividing Monomials (Quotient Rule)
- *Powers of Monomials (Power Rule)
- Multiplying & Dividing Numbers in Scientific Notation
- Adding & Subtracting Numbers in Scientific Notation
- Applications with Scientific Notation

*includes expressions with negative exponents

Quiz 3

Packet 4 (Ratios, Proportions, & Percents)

- Ratios & Rates
- Solving Proportions
- Proportion Word Problems
- Scale Drawings & Models
- Similar Figures
- Indirect Measurement
- Percent Proportion
- Discount, Mark-up, Sales Tax, and Tip Problems
- Percent Increase and Percent Decrease
- Simple Interest

Quiz 4

Packet 5 (Functions & Linear Relationships)

- Relations vs. Functions
- Domain and Range
- Slope (Given a Graph)
- Slope (Given Two Ordered Pairs)
- Slope Applications
- Slope-Intercept Form
- Slope-Intercept Form Applications
- Standard Form
- Linear vs. Nonlinear Functions
- Proportional Relationships (Direct Variation)

Quiz 5

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Packet 6 (Systems of Equations)

- Writing a System of Equations given a Graph
- Solving Systems of Equations Graphically
- Solving Systems of Equations Algebraically (Substitution/Elimination)
- Special Cases: No Solution/Infinite Solution
- Systems of Equations Applications

Quiz 6

Packet 7 (Basic Geometry Concepts)

- Angle Relationships (Vertical, Adjacent, Complementary, Supplementary)
- Parallel Lines Cut by a Transversal
- Pythagorean Theorem & Converse
- Pythagorean Theorem Word Problems
- Sum of the Interior Angles of a Polygon
- Properties of Quadrilaterals/Classifying Quadrilaterals
- Congruent Polygons

Quiz 7

Packet 8 (Transformations)

- Reflections
- Translations
- Rotations
- Dilations
- Identifying Transformations
- Writing Transformation Rules

Quiz 8

Packet 9 (Measurement: Area & Volume)

- Area and Perimeter of Composite Figures
- Area of Shaded Regions
- Area and Perimeter of Similar Figures
- Cross Sections of 3D Figures
- Volume of Prisms, Cylinders, Pyramids, Cones, and Spheres
- Surface Area of Prisms, Cylinders, Pyramids, Cones, and Spheres
- Effects of Changing Dimensions
- Volume and Surface Area of Similar Solids

Quiz 9

Packet 10 (Probability & Statistics)

- Theoretical vs. Experimental Probability
- Counting Principle
- Compound Probability: Independent Events
- Compound Probability: Dependent Events
- Measures of Central Tendency
- Mean Absolute Deviation
- Box-and-Whisker Plots
- Scatter Plots & Line of Best Fit
- Two-Way Tables & Relative Frequency

Quiz 10

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Name: _____ **Pre-Algebra Review:** Packet #1

Topic #1: Operations with Rational Numbers

1. $-1\frac{2}{3}+4\frac{1}{6}$	**2.** $7\frac{5}{6}-\frac{5}{14}$	**3.** $-3\frac{7}{12}\cdot-\frac{6}{7}$	**4.** $-4\div\frac{3}{11}$

5. Lee ran a mile in $7\frac{1}{3}$ minutes. His friend Sam ran the same mile in $8\frac{5}{9}$ minutes. How many minutes faster did Lee run?

6. Holly has $45\frac{5}{16}$ pounds of fertilizer. If she plans to use $\frac{3}{5}$ of the fertilizer on her front lawn and the rest on her back lawn, how much fertilizer will she use on the back lawn?

7. A large container contains $41\frac{2}{3}$ cups of lemonade. If the lemonade is to be poured into smaller cups, each holding $3\frac{1}{8}$ cups of lemonade, how many cups can be filled?

Topic #2: Exponents and Scientific Notation

Negative Exponent Rule: $x^{-a}=$		**Zero Exponent Rule:** $x^{0}=$
8. Rewrite the expressions using only positive exponents. Simplify if possible.		
a) 2^{-5}	**b)** $6^{-3}\cdot 8^{2}$	**c)** $3^{4}\cdot 12^{-1}\cdot 5^{0}$
9. Write the following values in scientific notation.		
a) 823	**b)** 0.00000000195	**c)** 64,100,000
10. Write the following values in standard form.		
a) 4.29×10^{8}	**b)** 8×10^{-1}	**c)** 7.5×10^{-4}

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Topic #3: Square and Cube Roots

List the first 20 perfect square numbers:		
List the first 12 perfect cube numbers:		
11. Evaluate each expression.		
a) $\sqrt{49}$	**b)** $-\sqrt{256}$	**c)** $\sqrt{\frac{4}{25}}$
d) $\sqrt[3]{216}$	**e)** $\sqrt[3]{1,331}$	**f)** $\sqrt[3]{-8}$
12. Estimate the following values to the nearest tenth.		
a) $\sqrt{78}$	**b)** $\sqrt{262}$	**c)** $-\sqrt{115}$
13. Determine the consecutive integers between which each square root lies.		
a) $\sqrt{12}$	**b)** $-\sqrt{158}$	**c)** $-\sqrt{40}$

Topic #4: The Real Number System

THE REAL NUMBERS: _____

IRRATIONAL NUMBERS: _____ **RATIONAL NUMBERS:** _____

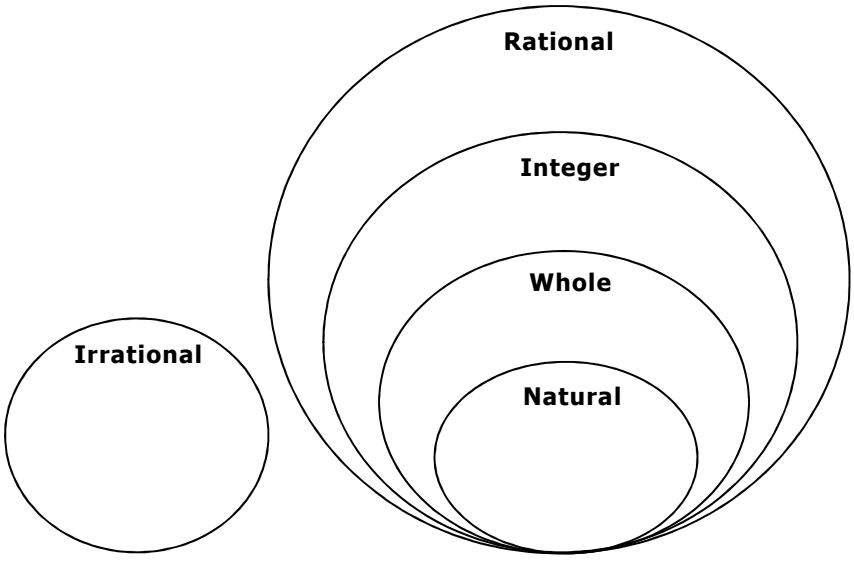
INTEGERS: _____

WHOLE NUMBERS: _____

NATURAL NUMBERS: _____

14. Place the LETTER of the values to the left in the smallest set that contains the value.

A. 7	**B.** $-\frac{45}{9}$
C. $-\sqrt{36}$	**D.** π
E. 6.0487	**F.** $0.\overline{2}$
G. $\sqrt{196}$	**H.** $-\sqrt{90}$
I. 0	**J.** 8^{-1}
K. -19	**L.** $\lvert -24 \rvert$
M. $\sqrt{\frac{1}{16}}$	**N.** 3.7×10^2



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Give an example of each, if possible.	
15. A rational number that is not an integer.	**16.** A natural number that is not a whole number.
17. An integer that is an irrational number.	**18.** A rational number that is a whole number.

Topic #5: Comparing & Ordering Number Forms

Rewrite #19 in order from least to greatest, then #20 in order from greatest to least.

19. $\left\{\sqrt{225},\ 2^6,\ 1\times10^1,\ \sqrt[3]{512},\ \sqrt{60},\ 4^2\right\}$

20. $\left\{4\%,\ \frac{4}{9},\ 4\times10^{-3},\ \frac{2}{5},\ 4^{-1},\ \frac{3}{8}\right\}$

Topic #6: Order of Operations

Evaluate each expression. Write your answer as a simplified fraction if necessary.

21. $5^2-(3^3-12)\div\left|-5\right|$

22. $\dfrac{\sqrt{64}-3^3+55}{5+(7-4^2)}$

23. $\dfrac{18+2(4-1)^3}{9^2-21}$

24. $\frac{7}{6}-\frac{9}{5}\cdot\frac{10}{27}$

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Topic #7: Evaluating Expressions

Evaluate each expression given the replacement values.	
25. $x^3 - 2x^2 + 17$ (if x = 3)	**26.** $a^2 - b^2$ (if a = -7 and b = 4)
27. $2m^2 - \sqrt{mn} + n^3$ (if m = 12 and n = 3)	**28.** $\frac{5}{12}x \div \frac{10}{3}y$ (if x = -4 and y = 6)

Topic #8: Properties

PROPERTY NAME	**WHAT IT MEANS**	**EXAMPLE(S)**
COMMUTATIVE		
ASSOCIATIVE		
DISTRIBUTIVE		
IDENTITY		
INVERSE		
ZERO PRODUCT		

Name the property that justifies each statement.	
29. $\frac{2}{7} \cdot \frac{7}{2} = 1$	**30.** $(-5 + 3) + 8 = -5 + (3 + 8)$
31. $(x + y) + 0 = x + y$	**32.** $6(2r + s) = 12r + 6s$
33. $8 - (2y + 7) = 8 - (7 + 2y)$	**34.** $8m + (-8m) = 0$
35. $(2p^2)q = 2(p^2q)$	**36.** $1 \cdot (a - 3b) = a - 3b$

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Pre-Algebra Review

QUIZ 1

Name: _____

Date: _____ **Per:** _____

1. A rectangle measures $15\frac{1}{4}$ feet by $8\frac{11}{15}$ feet. If the length and width are extended by $1\frac{2}{3}$ feet each, find the area of the new rectangle.

A. $184\frac{5}{12}$ ft^2

B. $175\frac{14}{15}$ ft^2

C. $172\frac{8}{9}$ ft^2

D. $180\frac{3}{4}$ ft^2

2. Which expression is equivalent to the expression below?

$$12^{-5} \cdot (-8)^{12} \cdot 7^0$$

A. $\frac{(-8)^{12} \cdot 1}{12^5}$

B. $\frac{1}{8^{12} \cdot 12^5}$

C. $\frac{(-8)^{12} \cdot 0}{12^5}$

D. $-(12)^5 \cdot (-8)^{12} \cdot 1$

3. Write an exponent in the box below that would make the statement true.

$0.000000000000782 = 7.82 \times 10^{\square}$

4. Which numbers are perfect squares? Check all that apply.

☐ 40	☐ 289
☐ 8	☐ 92
☐ 121	☐ 216

5. Evaluate the expression below. Write your answer in the box.

$$\sqrt[3]{729} + \sqrt{64} = \square$$

6. Which number lies between the same two consecutive integers as $\sqrt{58}$?

A. $\sqrt{42}$

B. $\sqrt{48}$

C. $\sqrt{65}$

D. $\sqrt{50}$

7. Which number is greater than 4^{-2} ?

A. 3^{-3}

B. 6.3×10^{-3}

C. 6%

D. $\frac{2}{25}$

8. Which list of numbers are correctly ordered from least to greatest?

A. $\left\{\frac{1}{40}, 1 \times 10^{-3}, 3^{-2}, 1\%\right\}$

B. $\left\{1 \times 10^{-3}, \frac{1}{40}, 1\%, 3^{-2}\right\}$

C. $\left\{1 \times 10^{-3}, 1\%, \frac{1}{40}, 3^{-2}\right\}$

D. $\left\{3^{-2}, \frac{1}{40}, 1\%, 1 \times 10^{-3}\right\}$

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9. Which of the following list contains rational numbers only?

A. $\left\{1.7295, \sqrt{200}, \frac{2}{5}, -\sqrt{9}\right\}$

B. $\left\{\sqrt{196}, \frac{40}{8}, -1\frac{4}{13}, -\sqrt{30}\right\}$

C. $\left\{-\frac{12}{5}, \sqrt[3]{64}, \sqrt{10}, 16\%\right\}$

D. $\left\{-\sqrt{144}, 0.\overline{92}, \frac{17}{11}, \sqrt{\frac{4}{49}}\right\}$

10. Which value is not an integer?

A. 20%

B. $-\sqrt{81}$

C. $\frac{42}{6}$

D. $.08 \times 10^2$

11. Which statement is true?

A. An integer is never a whole number.

B. A rational number is always a real number.

C. No number is both an integer and a natural number.

D. No number is both an irrational number and a real number.

12. Simplify the expression below. Write your answer in the box.

$$\frac{-|-14|+2^6}{26-(3+5^2)}$$

13. Evaluate the expression below if $x = \frac{15}{8}$ and $y = -3$.

$$\frac{3}{8}y^2 - \frac{4}{3}x$$

A. $-\frac{47}{8}$

B. $\frac{7}{8}$

C. $\frac{5}{12}$

D. $\frac{21}{16}$

14. Which expression could be placed in the box to show an example of the commutative property?

$$\frac{1}{2}(m+n) - p = \boxed{?}$$

A. $\frac{1}{2}m(n-p)$

B. $(m+n)\frac{1}{2} - p$

C. $p - \frac{1}{2}(m+n)$

D. $\frac{1}{2}m + \frac{1}{2}n - \frac{1}{2}p$

15. Write a value in each box to illustrate the inverse property of addition.

$$\frac{3}{7} + \square = \square$$

16. Which statement can not be justified by the properties of real numbers?

A. $(x+y)^2 = x^2 + y^2$

B. $(x-y)^2 z = z(x-y)^2$

C. $z(x^2+y^2) = x^2z + y^2z$

D. $(x-y)\cdot\frac{1}{x-y} = 1$

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Name: _____ **Pre-Algebra Review:** Packet #2

Topic #1: Translating Expressions

Translate each expression.	
1. "One less than the product of four and a number."	**2.** "Two-thirds of a number increased by seven."
3. "The difference between m and n."	**4.** "Nine subtracted from a number squared."
5. "The quotient of twice a number and five."	**6.** "The sum of one-fourth of a number and 27."

Topic #2: Simplifying & Factoring Expressions

Simplify each expression by distributing and/or combining like terms.		
7. $2(x+9)$	**8.** $-3(4c-1)$	**9.** $-(5p+17)$
10. $7a-8-6-2a$	**11.** $-5-14k-8+19k-k$	**12.** $-3m+n-2n-6m+17m$
13. $-7(2c+3)+5(c-1)$	**14.** $2-2(7w-4)+10w$	**15.** $\frac{2}{3}(6x-27)-(x+8)$

Factor each expression. If it cannot be factored, write "prime."			
16. $3x+9$	**17.** $8y-28$	**18.** $15m-8$	**19.** $32a-12b$

Topic #3: Solving Equations

Solve each equation. Give your answer as a simplified fraction if necessary.		
20. $8x-19=-91$	**21.** $-7=-1+\frac{a}{-2.5}$	**22.** $\frac{n-4}{2}=-13$

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23. $\frac{6}{5}v - 11 = -35$	**24.** $-2x - 7 - 1 - 3x = 37$	**25.** $13 - 2(6k - 8) = -27$
26. $8a + 17 = 5a + 5$	**27.** $\frac{1}{2}(10p + 18) = -3(p + 7)$	**28.** $w - (3w - 1) = 3(4w + 5)$

Translate and solve each equation.

29. "Ten subtracted from the product of a number and -3 is 29."	**30.** "The difference between a number and nine, divided by 4, is -7."

Topic #4: Special Solutions

Solve each equation and identify the solution.

31. $2(6x + 5) = 3(4x + 3)$	**32.** $10 - (2n + 3) = -\frac{1}{2}(4n - 14)$
33. $-3(6 - r) = 5r - 2(r + 9)$	**34.** $10 - (4 - 8h) = 2(4h - 3)$

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Topic #5: Equation Word Problems

Write and solve an equation to solve each problem.

35. Maggie opened a big bag of jelly beans and ate one-fifth of them. The next day, she ate 40 more jelly beans from the bag. If she ate 107 jelly beans between the two days, find the original number of jelly beans in the bag.

36. Josh used one hundred dollars less than three-fourths of his paycheck to buy a new TV. If the cost of the new TV was $488, how much was his paycheck?

37. The sum of two numbers is 86. The larger number is nine less than four times the smaller number. Find both numbers.

38. Nate and Gavin are playing a video game. Gavin has scored eleven more than twice the number of points than Nate has. If they scored 692 points altogether, have many points has Gavin scored?

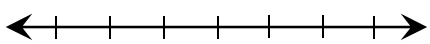
Topic #6: Solving & Graphing Inequalities

Identify each inequality symbol.

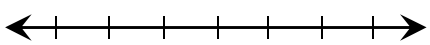
LESS THAN	LESS THAN OR EQUAL TO	GREATER THAN	GREATER THAN OR EQUAL TO

Solve and graph each inequality.

39. $5x - 9 > 6$



40. $\frac{k-7}{-4} \geq 2$



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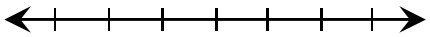
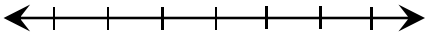
41. $15v + 32 < 11v - 24$



42. $9(a+1) \leq 3(4a-5)$



Solve each inequality and check the possible solutions.

43. $14 - 9x \geq 50$

- ❑ -7
- ❑ -6
- ❑ -5
- ❑ -4
- ❑ -3

44. $\frac{3}{4}(8n - 20) > 39$

- ❑ 7
- ❑ 8
- ❑ 9
- ❑ 10
- ❑ 11

Translate and solve each inequality.

45. "Eleven more than three times a number is at most 62."

46. "Twice a number subtracted from sixty is no less than twenty-eight."

Topic #7: Inequality Word Problems

Write and solve an inequality to solve each problem.

47. Ann is stocking up on boxes of cereal. If they are on sale for $2.25 each and she has a $2 coupon, and she wishes to spend a maximum of $20 on cereal, how many boxes can she buy?

48. Scott is selling coupon books to raise money for his football team. If he has raised $60 so far and the coupon books cost $15 each, how many more must be sell in order to raise at least $300?

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Pre-Algebra Review

QUIZ 2

Name: _____

Date: _____ **Per:** _____

1. Which expression does not simplify to $-8x + 27$?

A. $-7(2x-5)+6x-8$

B. $3x-17-11x+44$

C. $21-\frac{2}{3}(15x-9)+2x$

D. $33-(7-8x)+1$

2. Choose one term from Column 1 and one term from Column 2 to create a prime expression. Write your answers in the box.

[ ] + [ ]

Column 1	Column 2
$8x$	42
$9x$	30
$6x$	28

3. Which expression represents the factored form of the simplified expression below?

$$-36-3m+15m-4$$

A. $2(9m - 16)$

B. $2(9m - 20)$

C. $4(3m - 10)$

D. $4(3m - 8)$

4. Solve the equation below. Write your answer in the box.

$$\frac{2}{3}a-1=-11$$

$a =$ [ ]

5. Find the value of k.

$$7k-12=13k-42$$

A. $k = -5$

B. $k = 5$

C. $k = -9$

D. $k = 9$

6. Find the value of w.

$$3-(5w+14)=-\frac{3}{4}(12w+4)$$

A. $w = -2$

B. $w = 2$

C. $w = -7$

D. $w = 7$

7. Which equation has an infinite solution?

A. $2(x + 10) = 4(5 - x) + 6x$

B. $3(4x - 3) = 6(2x - 3)$

C. $-18 - (3x - 2) = 3(x - 5) - 1$

D. $-2(3x + 5) = 2(3x - 5)$

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8. At the beginning of a musical, four-fifths of the seats in the theater were filled. During intermission, 18 people left. If there were 286 people left, how many seats are in the theater?

A. 335

B. 350

C. 380

D. 400

9. Which equation results in a solution of 8?

A. Eighteen less than twice a number is two.

B. Fifteen subtracted from the quotient of a number and four is seventeen.

C. The sum of a number and seven, divided by five, is three.

D. The difference between one and the product of a number and three is twenty.

10. In one minute, Evan can do nine less than four times the number of push-ups that Lucy can do. If they did 61 push-ups in all, how many more push-ups did Evan do than Lucy?

A. 26

B. 28

C. 31

D. 33

11. To get an A in Science, Sally must get at least a 96 on her next test. Which inequality shows the grade, g, Sally needs?

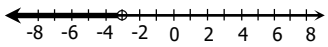
A. $g \geq 96$ **C.** $g > 96$

B. $g \leq 96$ **D.** $g < 96$

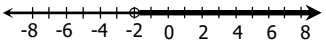
12. Which graph shows the solutions to the inequality below?

$$-5(2x+1) < 35$$

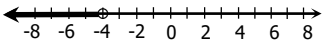
A.



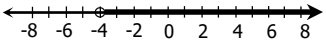
B.



C.



D.



13. Find the solution to the inequality below:

$$\frac{2}{3}(12x-9) \leq 5x-48$$

A. $x \geq -14$

B. $x \leq -14$

C. $x \geq -18$

D. $x \leq -18$

14. Which values are solutions to the inequality below? Check all that apply.

$$-7x+30 > -15-2x$$

☐ 5	☐ 9	☐ $\frac{60}{7}$
☐ $\sqrt[3]{64}$	☐ $\lvert -11 \rvert$	☐ $\sqrt{94}$

15. Taylor stopped at the gas station to get gas and a car wash. The car wash costs $5 and gas costs $2.50 per gallon. If she can spend at most $35, how many gallons of gas, x, can she afford?

A. $x \geq 12$

B. $x \leq 12$

C. $x \geq 16$

D. $x \leq 16$

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Name: _____ **Pre-Algebra Review:** Packet #3

Topic #1: Exponent Rules

Product Rule	**Quotient Rule**	**Power Rule**
$x^a \cdot x^b =$	$\frac{x^a}{x^b} =$	$(x^a)^b =$
Simplify each expression. Your final answer should contain only positive exponents.		
1. $x^2 \cdot x^8$	**2.** $-2m^8 \cdot 7m$	**3.** $6a^3b^2 \cdot 2a^4b^3$
4. $k^{-1} \cdot k^{-4}$	**5.** $8a^2 \cdot 2a^{-7}$	**6.** $4p^{-5}q^{-2} \cdot -7p^9q$
7. $\frac{n^{20}}{n^5}$	**8.** $\frac{32m^9}{8m^3}$	**9.** $\frac{-4a^6b^4}{6ab^4}$
10. $\frac{y^4}{y^7}$	**11.** $\frac{4v^8}{12v^{-2}}$	**12.** $\frac{c^{-9}d^3}{c^{-2}d^{11}}$
13. $(x^4)^6$	**14.** $(3m^2n^5)^3$	**15.** $(-7a^9b^3c)^2$
16. $(w^{-2})^9$	**17.** $(2a^{-5})^{-4}$	**18.** $(5m^{-1}n^7)^3$

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Topic #2: Multiplying & Dividing Numbers Written in Scientific Notation

Multiplication	**Division**
$(x \times 10^a) \cdot (y \times 10^b) =$	$\dfrac{(x \times 10^a)}{(y \times 10^b)} =$
Simplify each expression. Final answers must be written properly in scientific notation.	
19. $(2 \times 10^7) \cdot (3 \times 10^4)$	**20.** $(8 \times 10^{-2}) \cdot (9 \times 10^8)$
21. $(6.5 \times 10^{-7}) \cdot (3.2 \times 10^{-3})$	**22.** $(1.8 \times 10^1) \cdot (7.2 \times 10^{-5})$
23. $(8 \times 10^{12}) \div (4 \times 10^4)$	**24.** $(3 \times 10^{-2}) \div (4 \times 10^{-4})$
25. $\dfrac{2.4 \times 10^7}{6 \times 10^{16}}$	**26.** $\dfrac{3.6 \times 10^{-5}}{9.6 \times 10^{-13}}$

Topic #3: Adding & Subtracting Numbers Written in Scientific Notation

For adding or subtracting numbers written in scientific notation: Adjust the exponents so they are the _____, then add/subtract the numbers and _____ the _____ exponent!
Simplify each expression. Final answers must be written properly in scientific notation.

27. $(6 \times 10^{-4}) + (1.2 \times 10^{-4})$	**28.** $(3.25 \times 10^{15}) - (3.07 \times 10^{15})$

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29. $(8.1\times10^{6})+(2.5\times10^{5})$	**30.** $(5.1\times10^{-2})-(2.3\times10^{-1})$
31. $(1.2\times10^{9})-(9.5\times10^{8})$	**32.** $(9.2\times10^{11})+(4.98\times10^{13})$

Topic #4: Applications with Scientific Notation

Simplify each expression. Final answers must be written properly in scientific notation.
33. If the United States is approximately 3.8×10^{6} square miles and France is approximately 2.1×10^{5} square miles, approximately how many more square miles is the United States than France?
34. The total revenue of a certain company was 2.4×10^{7} dollars in 2015. In 2016, the total revenue was 75% of the total revenue in 2015. Find the total revenue in 2016.
35. The population of a city is currently 3.5×10^{6}. This is approximately 40 times more than it was one hundred years ago. Find the population of the city one hundred years ago.
36. Jayden bought a new computer with 2.56×10^{11} bytes of hard drive space. He also signed up for a Dropbox account that offers 2×10^{9} bytes of space. How much storage space does he have in total between his computer and Dropbox?

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Pre-Algebra Review

QUIZ 3

Name: _____

Date: _____ **Per:** _____

1. Simplify the expression below.

$$7p^2 \cdot 4p^6$$

A. $28p^8$

B. $11p^8$

C. $28p^{12}$

D. $11p^{12}$

2. Simplify the expression below.

$$\frac{-20w^{12}}{4w^3}$$

A. $-16w^4$

B. $-5w^4$

C. $\frac{w^9}{5}$

D. $-5w^9$

3. Which expression simplifies to $16a^{12}b^4$?

A. $-8a^2b \cdot -2a^6b^4$

B. $\frac{32a^{24}b^8}{2a^2b^2}$

C. $(-4a^6b^2)^2$

D. $(4a^3b)^4$

4. Write the values in the boxes that make the statement true.

$$\frac{5}{3}xz^{\square} \cdot \square x^{\square} y^{\square} z^2 = 15x^7z^{10}$$

5. Simplify the expression below.

$$(3k^{-2})^3$$

A. $27k$

B. $\frac{27}{k^6}$

C. $\frac{9}{k^6}$

D. $9k$

6. Simplify the expression below.

$$\frac{c^{-8}d^5}{c^{-6}d^5}$$

A. $\frac{1}{c^{14}}$

B. $\frac{1}{c^2}$

C. $\frac{d}{c^2}$

D. $\frac{d}{c^{14}}$

7. Write a value in the box that makes the statement true.

$$w^{\square} \cdot w^{-2} = \frac{1}{w^8}$$

8. Which expressions are equivalent to $\frac{18a^{14}}{b^4}$? Check all that apply.

☐ $\frac{54a^{16}b^{-1}}{3a^2b^3}$	☐ $18(a^{10}b^{-1})^4$
☐ $(9a^7b^{-2})^2$	☐ $24a^2b^{-2} \cdot \frac{3}{4}a^{12}b^{-2}$
☐ $3a^7b \cdot 6a^2b^{-4}$	☐ $\frac{20a^{19}b^{-5}}{-2a^{-1}b^1}$

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9. Find the product of 9×10^{12} and 4×10^{4}.

A. 3.6×10^{15}

B. 3.6×10^{17}

C. 3.6×10^{46}

D. 3.6×10^{48}

10. Evaluate the expression below.

$$(7.5 \times 10^{9}) + (4.3 \times 10^{9})$$

A. 1.18×10^{10}

B. 1.18×10^{8}

C. 1.18×10^{19}

D. 1.18×10^{17}

11. Evaluate the expression below.

$$(1.1 \times 10^{-6}) - (2.9 \times 10^{-7})$$

A. -1.8×10^{-13}

B. 1.8×10^{1}

C. 8.1×10^{-6}

D. 8.1×10^{-7}

12. Evaluate the expression below.

$$\frac{6.3 \times 10^{15}}{(7.15 \times 10^{5}) + (5 \times 10^{3})}$$

A. 8.75×10^{7}

B. 8.75×10^{-1}

C. 8.75×10^{9}

D. 8.75×10^{2}

13. A factory manufactures 9×10^{5} packs of gum each month. They send these out to 16 different distribution centers. If each distribution center gets the same number of packs, how many are sent to each center?

A. 5.625×10^{4}

B. 5.625×10^{6}

C. 1.44×10^{4}

D. 1.44×10^{6}

14. The population of five cities in Pennsylvania is shown in the table below. How many total people live in the two most populated cities? Give your answer in scientific notation.

Allentown	**1.2×10^{5}**
Philadelphia	**1.6×10^{6}**
Erie	**9.9×10^{4}**
Pittsburgh	**3.1×10^{5}**
Scranton	**7.5×10^{4}**

15. Earth's mass is approximately 6×10^{24} kilograms. Find the mass of Neptune if it is 17 times greater than the mass of Earth.

A. 1.1×10^{27}

B. 1.1×10^{25}

C. 1.02×10^{22}

D. 1.02×10^{26}

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Name: _____ **Pre-Algebra Review:** Packet #4

Topic #1: Ratios & Rates

Use for questions 1 and 2: There are 30 freshmen, 37 sophomores, 25 juniors, and 48 seniors in the marching band. Find each ratio and give your answer in simplest form.

1. What is the ratio of freshman to seniors? Write your answer in simplest form.

2. What is the ratio of juniors to the total number of students in the band? Write your answer in simplest form.

3. Tessa burned 357 calories in 42 minutes on the elliptical. Ashley only spent 30 minutes on the elliptical and burned 267 calories. Who burned calories at a faster rate?

4. Mr. Rickman filled his tank with 16 gallons of gas for $35.04. Later that day, his wife filled her tank with 18 gallons of gas for $39.96 at a different gas station. Who got the better deal?

Topic #2: Proportional Relationships

Solve the following proportions.

5. $\frac{5}{3} = \frac{x}{57}$

6. $\frac{14}{x} = \frac{4}{7}$

7. $\frac{1.8}{x} = \frac{9}{3.5}$

8. If it took Max 54 minutes to drive a 60-mile stretch of highway, how long would it take him to drive a 75-mile stretch if he maintains a constant speed?

9. The recreation center is hiring counselors for summer camp. They need four counselors for every 25 campers. If there are 140 campers, how many counselors will they need?

10. Colton was in a hot dog eating contest. If it took him 90 seconds to eat seven hot dogs, how many full hot dogs did he eat in ten minutes?

11. Ryan and Jess went for an 8-mile run. It took Ryan 25 minutes to reach the 3-mile point. If Jess reached this point 7 minutes after Ryan did, how long did it take her to complete the 8 miles if she maintained a constant speed?

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12. The distance between two cities on a map is $3\frac{7}{8}$ inches. If the map uses a scale of $\frac{1}{2}$ inch = 25 miles, find the actual distance between the cities.

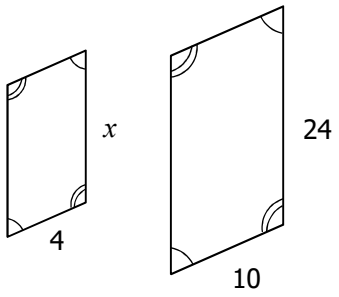
13. A model of the White House uses a scale of 2 inches = 15 feet. If the actual White House is 70 feet tall, how tall is the model?

14. Bill is replacing his 15 feet long by 12 feet wide deck. The new deck will add five feet to the length and four feet to the width. If a drawing of the new deck uses a scale of 1 inch = 2.5 feet, find the dimensions of the deck on the drawing.

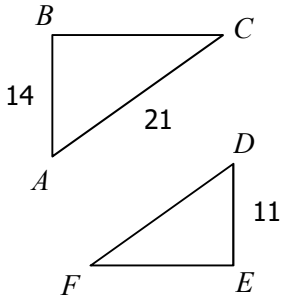
15. If a model 184-foot long NASA Space Shuttle is 8 inches long, what scale was used to create the model?

Topic #3: Similar Figures & Indirect Measure

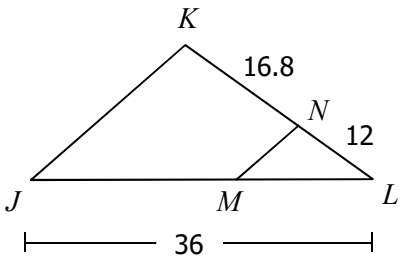
16. If the figures are similar, find x.



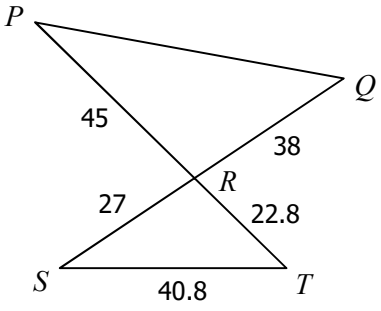
17. If $\Delta ABC \sim \Delta DEF$, find FD.



18. If $\Delta JKL \sim \Delta MNL$, find ML.



19. If $\Delta PQR \sim \Delta STR$, find PQ.



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20. A 28-foot tall tree casts a shadow 15 feet long at the same time that a building casts a shadow 72 feet long. How tall is the building?

21. The Gateway Arch in St. Louis, Missouri is 630 feet tall. If a 6-foot tall person standing near the Arch casts a shadow 2.5 feet long, find the length of the shadow casted by the Arch.

Topic #4: Percents

22. In a school survey, 62.5% of the students surveyed said they were in favor of new school uniforms. If 720 students were surveyed, how many are in favor of new uniforms?

23. Ciara put 5.28 gallons of gas in her car. If this only fills up 20% of her tank, how many more gallons can she put in?

24. A new Apple Watch costs $369. If the watch is on sale for 15% off, what is the sale price?

25. Hotels on the beach generally markup room rates on holiday weekends. If a hotel room that is regularly priced at $149 per night is marked up 30%, find the cost after the markup.

26. Ari is buying a new bicycle for $290. If sales tax is 6.4%, how much will be added to the price of the bicycle?

27. Blake is buying an open-box laptop that has been discounted 25%. If the laptop was originally $1,199 and sales tax is 8.25%, how much will he pay in total?

28. The Smith family went out to dinner. Their bill came to $67.80. If they left a 15% tip and used a $100 gift card to pay for the bill, including the tip, what is the remaining balance on the card?

29. The table below shows the sale prices at a certain store. Kate picked out a shirt that regularly costs $20 and a hat that regularly costs $24. If she can spend no more than $75, can she also afford a pair of jeans that regularly cost $58?

Item	Discount
Shirts	25%
Jeans	30%
Hats	15%
Backpacks	20%

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30. Justin bought a boat for $35,000 in 2014. In 2016, it was worth $21,000. Find the percent of change from 2014 to 2016.	**31.** Savannah bought a $390 tablet. With sales tax, the total cost was $419.25. Find the sales tax percentage.
32. A certain lake is 85 feet deep. After a hurricane, the level of the lake rose to 88 feet. Find the percent of change in the depth of the lake. Round to the nearest tenth of a percent.	**33.** Jade bought a home for $129,500. She sold it fifteen years later for $9,000 less than twice the amount she had originally purchased it for. Find the percent of change in the purchase price of the home.

Topic #5: Simple Interest

34. Thomas put $675 in a savings account that pays 3% simple interest. How much interest will he earn in twenty years?	**35.** Stephanie borrowed $16,825 from the bank at a 5.2% interest rate to purchase a car. How much will she have paid in interest after five years?
36. If $4,000 is invested in an account that earns 2.4% interest, find the total amount in the account after 8 years.	**37.** Andy bought a $1,449 refrigerator using a store credit card with a 24% interest rate. If he did not charge anything else and took 18 months to pay, how much did he pay in total?
38. Find the initial deposit into an account that earned $243 in fifteen years at an interest rate of 1.8% after.	**39.** How long will it take a $2,500 investment to earn $1,000 in interest at a 4% interest rate?
40. How long will it take a $3,000 investment to triple in value at a 2.5% interest rate?	**41.** Cecil took out a 60-month loan for $9,500 to purchase a motorcycle. At the end of the loan, he had a paid a total of $11,827.50. Find the interest rate.

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Pre-Algebra Review

QUIZ 4

Name: _____

Date: _____ **Per:** _____

1. A snowstorm brought 22 inches of snow to Buffalo in 12 hours, then 2 feet of snow to Rochester in 14 hours. Syracuse got 4 inches less snow than Buffalo in 8 hours. Which city had a heavier snowfall rate?

A. Buffalo
B. Rochester
C. Syracuse
D. It was the same for all three cities.

2. Solve the proportion below. Write your answer in the box.

$$\frac{3.5}{20} = \frac{9.1}{x}$$

$x =$ _____

3. Alana drove 1,400 miles from Detroit to Miami. If her car averages 28 miles per gallon and the capacity of her gas tank is 24 gallons, how many times did she have to fill up her gas tank along the way, assuming she started with an empty tank?

A. 1 time
B. 2 times
C. 3 times
D. 4 times

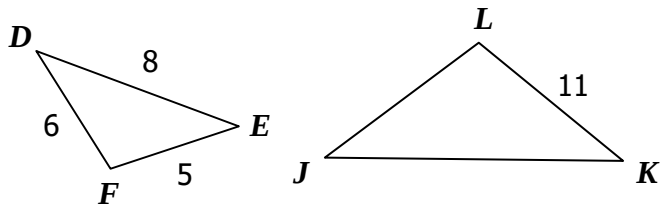
4. The scale on a map reads $\frac{3}{4}$ inch = 50 miles. If the actual distance between the two cities is 325 miles, find the distance between the cities on the map.

A. $4\frac{7}{8}$ inches
B. $4\frac{13}{16}$ inches
C. $4\frac{1}{2}$ inches
D. $4\frac{3}{4}$ inches

5. A company is manufacturing models of the Eiffel Tower to sell in gift shops. If the model needs to fit in a 1-foot tall box, and the actual height of the tower is 984 feet, which scale is best?

A. 1 inch = 50 feet
B. 4 inches = 250 feet
C. 3 inches = 200 feet
D. 2 inches = 175 feet

6. If $\Delta DEF \sim \Delta JKL$, find JK.



A. 14.7
B. 15.5
C. 17.6
D. 18.2

7. Elijah is 5'9" tall and casts a 4-foot shadow. He is standing near a tree that casts a 24-foot shadow. How tall is the tree?

A. 30.2 feet
B. 32.8 feet
C. 34.5 feet
D. 36.1 feet

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8. Jordan's fish tank was only 62.5% full so he added some water to it so it got to 80% full. If the tank now has 40 gallons of water in it, how many gallons did he add?

A. 8.25 gallons
B. 8.5 gallons
C. 8.75 gallons
D. 9 gallons

9. Ella bought a $379 tablet for 15% off. The next day, she saw that it was marked down an additional 20% off the sale price. How much more money would she have saved by waiting a day to purchase the tablet?

A. $18.95
B. $24.52
C. $48.16
D. $64.43

10. Mr. Hillman is buying boxes of colored pencils for his classroom. They regularly cost $1.80 each but are on sale for 30% off. If sales tax is 6% and he has a $40 budget, how many boxes can be buy?

A. 27 boxes
B. 28 boxes
C. 29 boxes
D. 30 boxes

11. The bill for a group of eight people at a restaurant came to $196. Because they are a large party, the restaurant also adds an 18% tip on top of this. If they decide to equally split the bill, including the tip, how much will each person pay?

A. $28.91
B. $29.35
C. $30.77
D. $31.08

12. When Martin started his job in 2007, his salary was $40,000. In 2016, his salary was $72,000. What is the percent increase of his salary from 2007 to 2016? Write your answer in the box.

13. The table below shows the total rainfall in 2015 and the total rainfall in 2016 for four different cities. Which city had the greatest percent decrease in rainfall from 2015 to 2016?

City	Total 2015 Rainfall (in)	Total 2016 Rainfall (in)
Greystone	53.2	49.7
Sierra	45.8	42.9
Lakeville	43.5	41.2
Ashland	50.4	46.8

A. Greystone
B. Sierra
C. Lakeville
D. Ashland

14. Stacy put $650 in a bank account that earns 7% simple interest. How much total will she have in the account after 20 years?

A. $910
B. $1,560
C. $1,820
D. $1,995

15. Ian took out a 60-month loan from the bank to purchase a $27,000 car. If the simple interest rate is 4.5%, how much would he save if he pays the car off in three years instead of the entire length of the loan?

A. $2,190
B. $2,430
C. $2,550
D. $2,620

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Name: _____ **Pre-Algebra Review:** Packet #5

Topic #1: Relations & Functions

Identify the domain and range of each relation, then determine if the relation is a function.

1.

{(-7, -1), (-4, 2), (0, 5), (4, -1)}

Domain: _____

Range: _____

Function? _____

2.

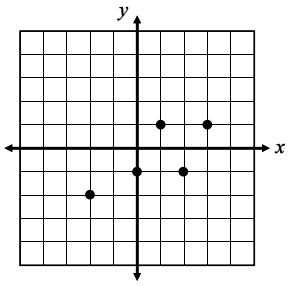
x	*y*
2	-4
-5	2
9	0
2	-1
1	4

Domain: _____

Range: _____

Function? _____

3.



Domain: _____

Range: _____

Function? _____

Topic #2: Equations as Functions

Given the function and its domain, find the range.

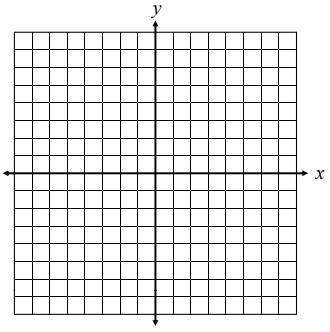
4. $y = -4x + 5$; domain = {-7, -1, 2}

5. $y = \frac{3}{2}x - 1$; domain = {-10, -6, -2}

Complete each function table, then graph.

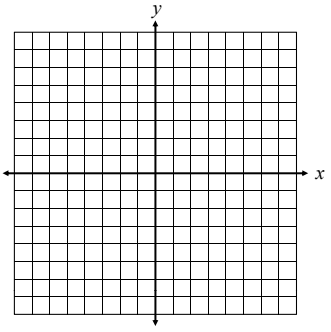
6. $y = -2 - x$

x	*y*
-5	
-3	
1	
4	



7. $y = 1 - \frac{2}{3}x$

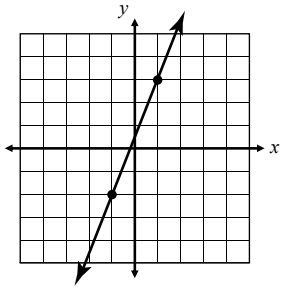
x	*y*
-6	
-3	
0	
6	



Topic #3: Slope

Find the slope of the line given the graph.

8.



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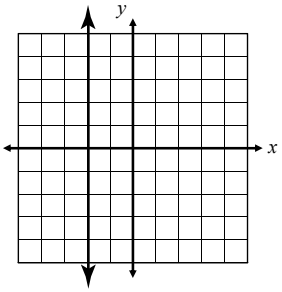

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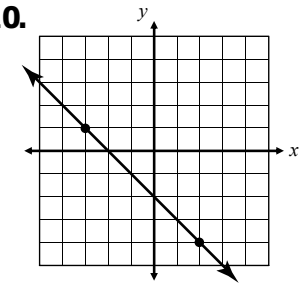
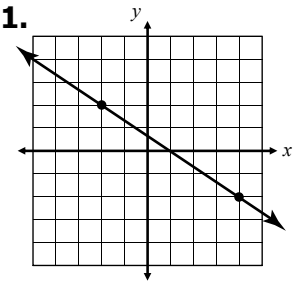


11.



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Given any two points (x_1, y_1) and (x_2, y_2), you can find the slope of the line that passes through the points using the **slope formula.**

SLOPE FORMULA

Find the slope of the line that passes through the given points.

12. (2, -1) and (-2, -9)

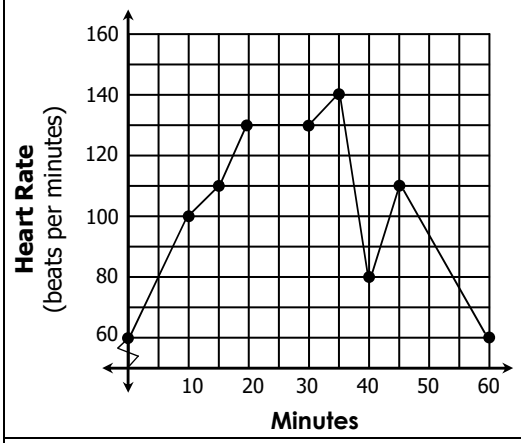
13. (7, 3) and (2, 3)

14. (4, -3) and (-11, 9)

15. (-4, 6) and (-4, 7)

In real world contexts, slope is often referred to as _____ _____ _____!

16. Bailey exercised at the gym for 60 minutes. The graph below shows her heart rate, in beats per minute, at certain points during her workout.



a) Find the rate of change in her heart rate in the first 10 minutes of her workout.

b) Find the rate of change in her heart rate from 45 to 60 minutes.

c) Find the rate of change in her heart rate from 20 to 30 minutes.

17. At 2:40 p.m. a plane at an altitude of 30,000 feet begins its descent. At 2:48 p.m., the plane is at 25,000 feet. Find the rate in change in the altitude of the plane during this time.

18. On the first day of May, Eric's bank account balance was $533.70. On the last day of the same month, his balance was $804.95. Find the rate of change in his balance during this time.

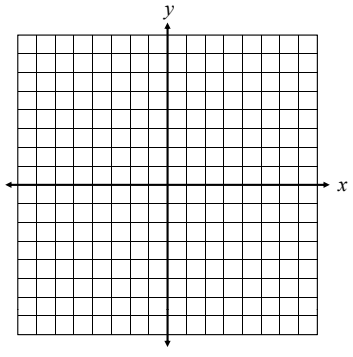
Topic #4: Graphing Linear Equations: Slope-Intercept Form, Standard Form, Vertical & Horizontal Lines

Linear equations are often written in **slope-intercept form** where m is the slope and b is the y-intercept

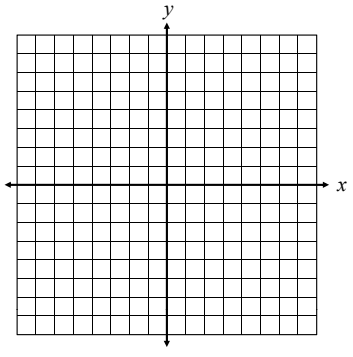
SLOPE-INTERCEPT FORM

Identify the slope and y-intercept, then graph the equation.

19. $y = 3x - 1$



20. $y = -x + 7$



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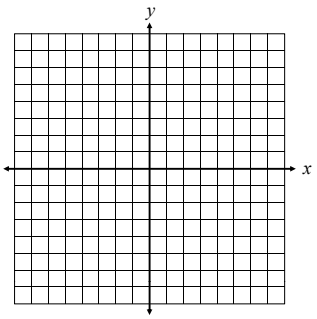
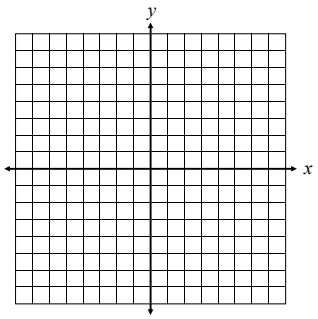
21. $y = \frac{2}{5}x - 4$



22. $y = -\frac{1}{3}x$

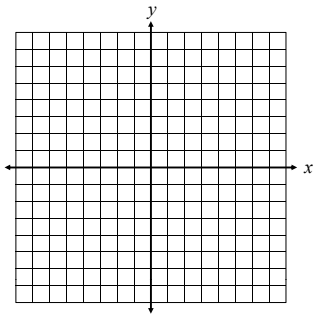


Linear equations are also often written in **standard form.**
You can convert these to slope-intercept form by solving for y.

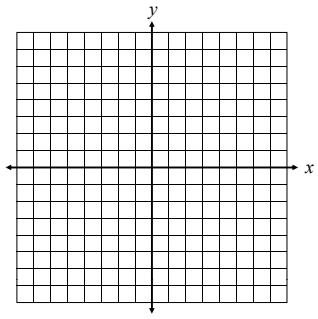
STANDARD FORM

Write the equation in slope-intercept form, then graph.

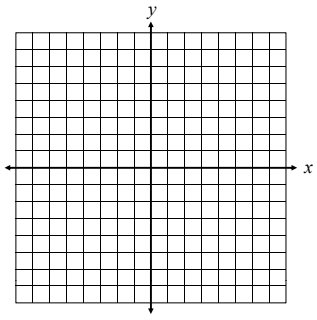
23. $x + 5y = 10$



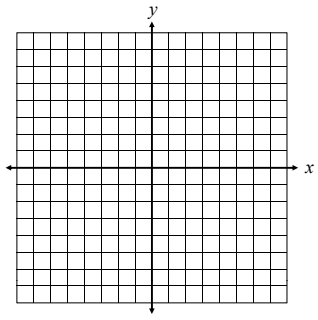
24. $x - y = 3$



25. $8x - 6y = -6$

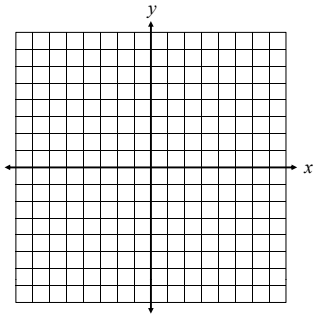


26. $x - 2y = 14$

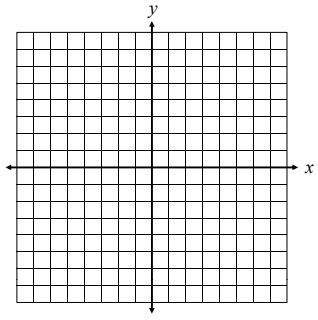


Graph each line.

27. $x = -1$



28. $y = 6$



Topic #5: Slope-Intercept Form Applications

29. A photo printing website charges a flat rate of \$3 for shipping, then \$0.18 per printed photo. Elena just returned from a trip to Europe and would like to print her pictures. Write an equation to show the total amount she will pay, then answer the following questions.

a) What is the rate of change?

b) What is the initial value?

c) What is the independent variable?

d) What is the dependent variable?

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30. Carly baked a pizza in her oven at $450^{\circ}F$. Once the pizza was done and she turned the oven off, the temperature decreased at a rate of 8° per minute. Write an equation that gives the temperature of the oven each minute after she turned it off, then answer the following questions.

a) Find the temperature of the oven after 15 minutes.

b) Find the number of minutes it will take the oven to reach a temperature of $72^{\circ}F$.

Topic #6: Direct Variation

A **direct variation** (or proportional relationship) is a special type of linear function in which there is a constant rate of change between the variables (_____) and the y-intercept is always _____.

DIRECT VARIATION

Determine if the values in the table represent a direct variation. If yes, identify the constant of variation and write an equation to represent the relationship.

31.

x	y
0	0
1	2
2	4
3	6

32.

x	y
-2	1
-1	0
0	-1
1	-2

33.

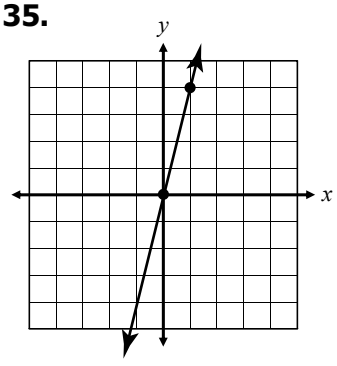
Ounces	Cost
2	\$0.80
5	\$2.00
8	\$3.20
12	\$4.80

34.

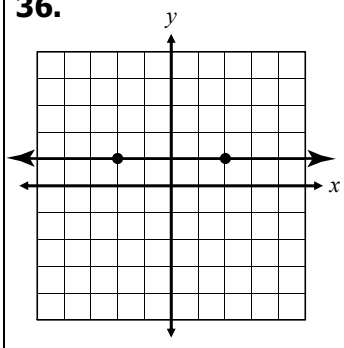
Time (s)	Depth (ft)
0	0
5	-15
10	-30
15	-45

Determine if the graph represents a direct variation. If yes, identify the constant of variation and write an equation to represent the relationship.

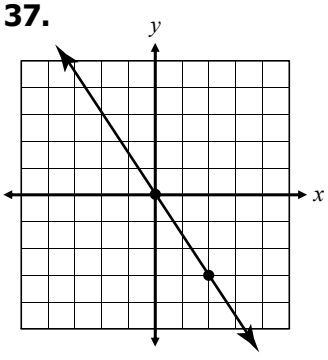
35.



36.



37.



Determine if the equation represents a direct variation. If yes, identify the constant of variation.

38. $\frac{y}{x} = -3$

39. $2x + 2y = 2$

40. $\frac{y}{x} = -\frac{5}{3}$

41. $xy = 9$

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42. The distance traveled by a train varies directly to the length of time it travels. If it took the train 8 hours to travel 472 miles, identify the constant of variation and write an equation to represent the relationship.

43. The height of a television varies directly with its width. If a television has a height of 27 inches and a width of 48 inches, identify the constant of variation and write an equation to represent the relationship.

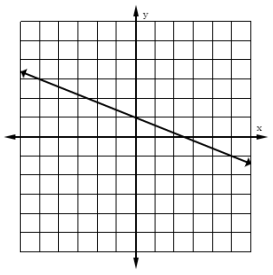
44. The amount of money that Kailyn earns varies directly with the number of hours she works. If she works for 15 hours and makes 146.25, how much will she make in 40 hours?

45. Weight on Mars varies directly with weight on Earth. If an astronaut that weighs 200 pounds on Earth weighs 76 pounds on Mars, find the weight of an astronaut on Mars who weighs 230 pounds on Earth.

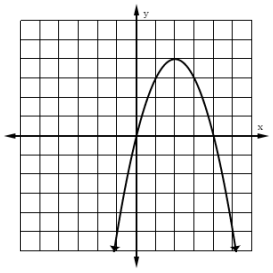
Topic #7: Linear vs. Nonlinear Functions

Determine if the graph, equation, or table represents a linear or nonlinear function.

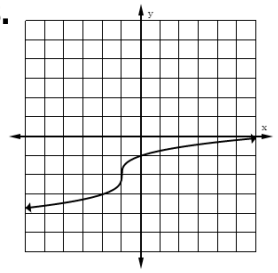
46.



47.



48.



49. $y = x^2$

50. $y = -5x + 1$

51. $2x - 7y = 0$

52. $y = \frac{8}{x}$

53. $y = -5 - \frac{x}{3}$

54. $x^3 - x^2 = 2y$

55.

x	y
1	6
4	5
7	4
10	3

56.

x	y
2	1
4	8
6	18
8	24

57.

x	y
3	-4
-2	-1
-7	2
-12	5

Pre-Algebra Review

QUIZ 5

Name: _____

Date: _____ **Per:** _____

1. Which relation represents a function?

A.

x	1	1	1	1
y	-2	0	2	4

B.

x	0	2	4	2
y	-4	-3	-2	-1

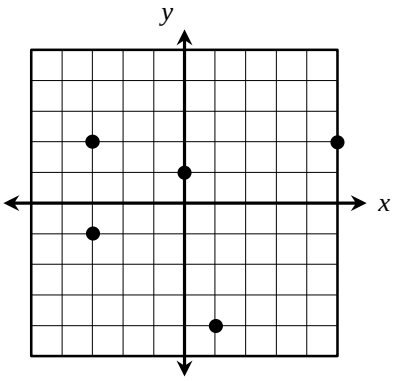
C.

x	-5	-4	-3	-5
y	3	3	3	3

D.

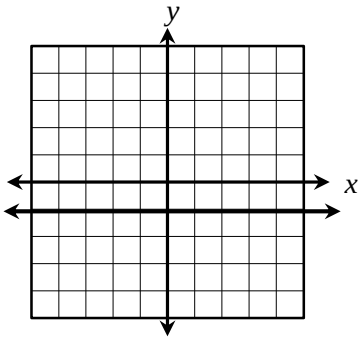
x	-3	-1	0	4
y	-3	-1	0	4

2. Which value is not in the range of the relation shown below?



A. -3
B. -1
C. 1
D. 2

3. What is the slope of the line on the graph?



A. -1
B. 1
C. 0
D. undefined

4. Find the slope of the line that passes through the points (2, -1) and (-2, 9). Write your answer as a fraction in simplest form.

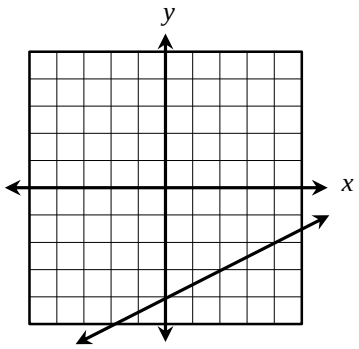
5. Find the slope of the line that passes through the points (-6, 5) and (-6, 8).

A. -1/4
B. 1/4
C. 0
D. undefined

6. At 11:59 p.m. on December 31st, the Times Square Ball in New York City was 725 feet above ground. One minute later, it was 584 feet above ground. Which of the following gives the rate of change of the ball in feet per second?

A. 2.35 ft/s
B. -2.35 ft/s
C. 2.82 ft/s
D. -2.82 ft/s

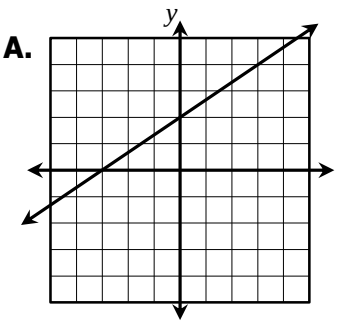
7. Which equation best represents the line shown on the graph?



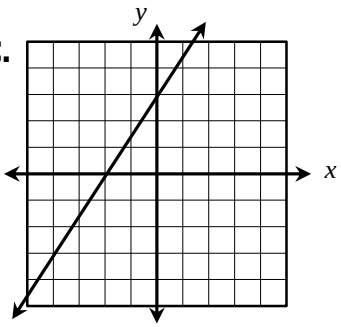
A. $y = -4 - \frac{1}{2}x$
B. $y = -4x + 2$
C. $y = \frac{1}{2}x - 4$
D. $y = 2x - 4$

8. Which graph best represents the equation $4x + 6y = 12$?

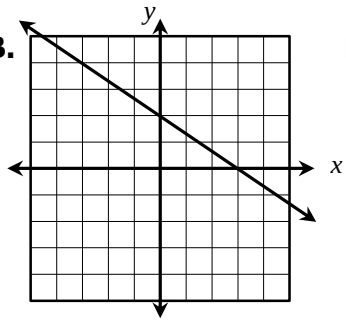
A.



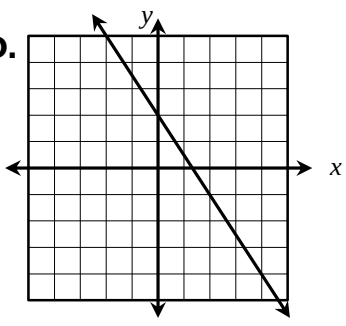
C.



B.



D.



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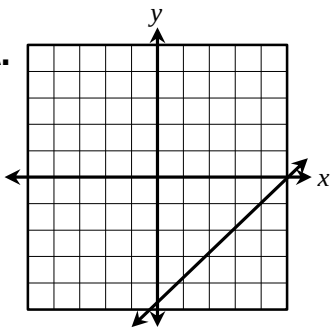
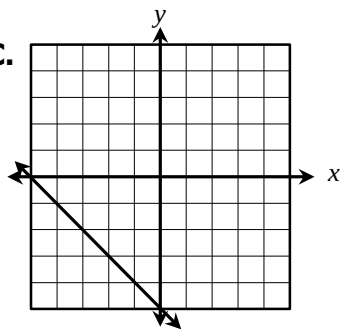
9. Which graph best represents the equation $x - y = -5$?

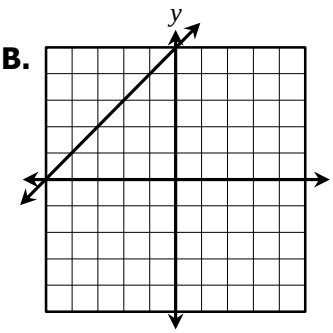
A.



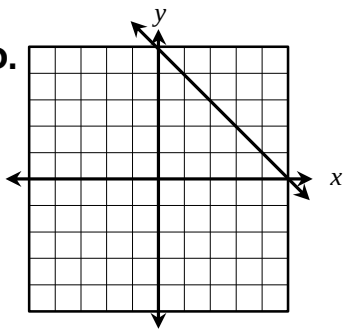
C.



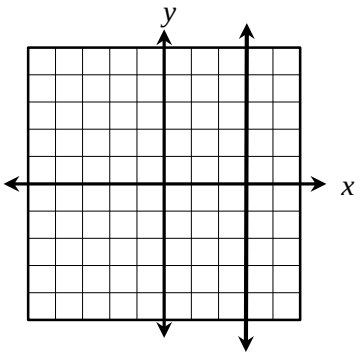
B.



D.



10. Which equation best represents the line shown on the graph?



A. $y = 3x$

B. $y = 3$

C. $x = 3$

D. $x = 1$

Use for questions 11-13: Aiden weighed 7.2 pounds at birth. In his first year, he gained 1.5 pounds per month.

11. If y represents Aiden's weight at x months, write an equation in slope-intercept form that gives Aiden's weight each month.

12. Which of the following represents the dependent variable?

A. weight

B. months

C. 7.2

D. 1.5

13. How much did Aiden weigh at 9 months old?

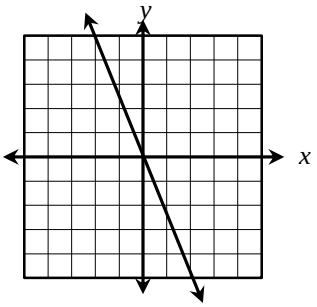
14. Which of the following does not show a direct variation relationship?

A. $4x - 3y = 0$

B.

x	y
-1	-2
0	0
1	-2
2	-4

C.



D.

Download Speeds	
Seconds	**Megabits**
5	39
25	195
40	312
60	468

15. The amount of vinegar, v, added to water to create a cleaning solution varies directly to the amount of water, w. For 8 cups of water, ½ cup of vinegar is added. Which of the following equations represents this relationship?

A. $v = \frac{1}{16}w$

B. $v = \frac{1}{4}w$

C. $v = 16w$

D. $v = 4w$

16. Which of the following represents a linear function?

A. $x^2 - 2y^2 = 6$

B.

x	y
0	0
2	1
4	2
6	8

C. $xy = -4$

D.

x	y
-4	5
1	2
6	-1
11	-4

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Name: _____ **Pre-Algebra Review:** Packet #6

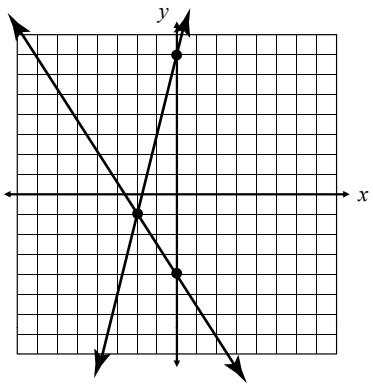
Topic #1: Types of Solutions to a System of Equations

Sketch and label the three types of solutions possible for a system of equations.		

Topic #2: Writing Systems of Equations & Identifying Solution

Write a system of equations given the graph, then identify the solution.

1.

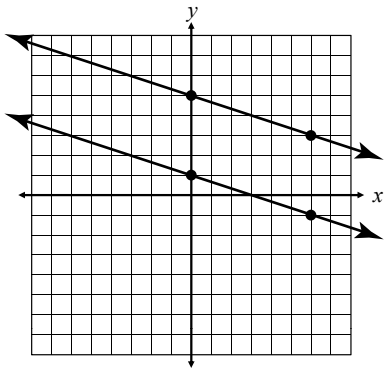


_____

_____

Solution: _____

2.



_____

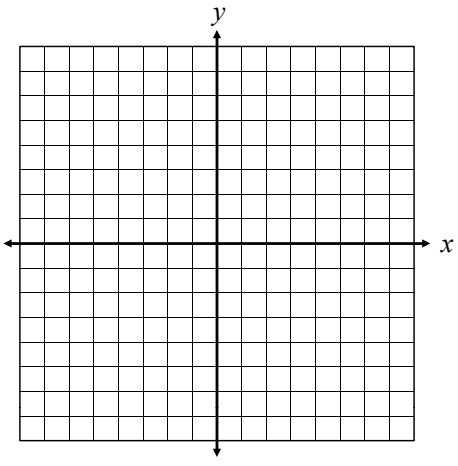
_____

Solution: _____

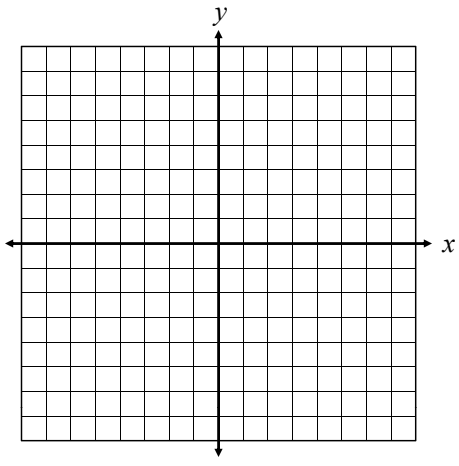
Topic #3: Solving Systems of Equations by Graphing

Solve each system by graphing. Be sure to clearly give the solution.

3. $\begin{cases} y = -x + 3 \\ y = \frac{2}{3}x - 7 \end{cases}$



4. $\begin{cases} y = 3x + 2 \\ y = -3x + 8 \end{cases}$



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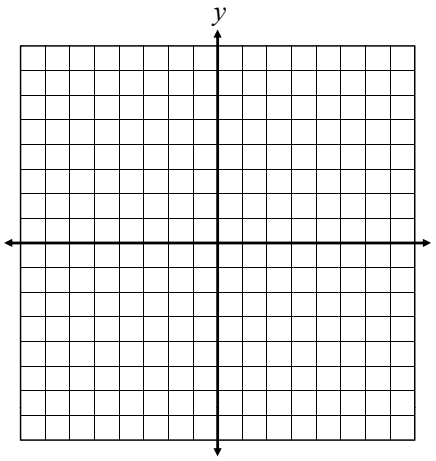
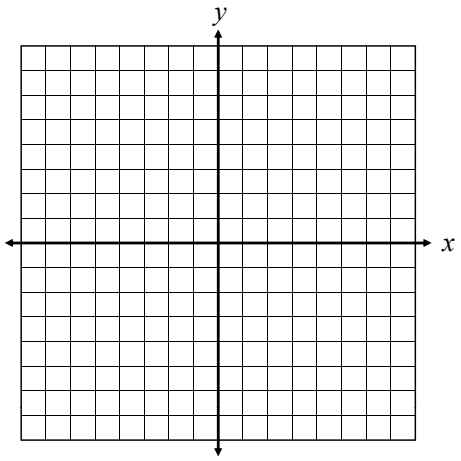
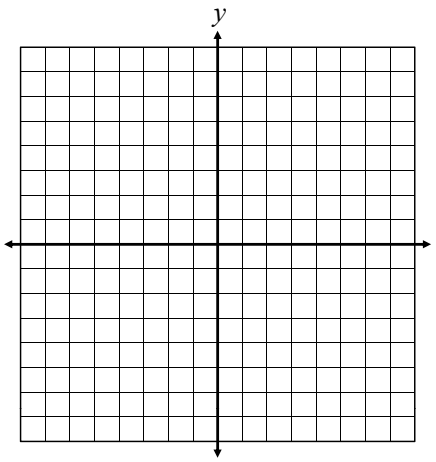
5. $\begin{cases} y = -2x - 6 \\ x = -7 \end{cases}$



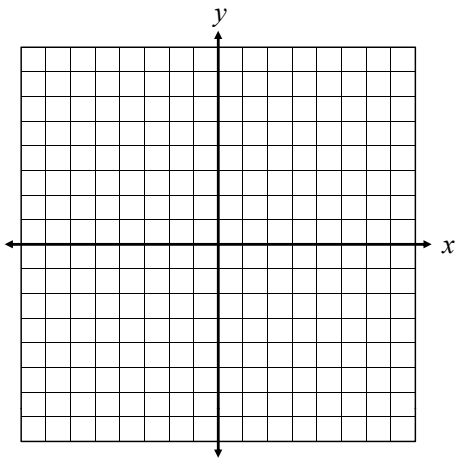
6. $\begin{cases} y = -\frac{5}{4}x + 3 \\ y = x - 6 \end{cases}$



7. $\begin{cases} x - 2y = 14 \\ 7x + 8y = 32 \end{cases}$



8. $\begin{cases} 8x - 2y = 12 \\ 4x - y = 6 \end{cases}$



Topic #4: Solving Systems of Equations Algebraically

Solve each system by SUBSTITUTION. Be sure to clearly give the solution.

9. $\begin{cases} y = -3x + 13 \\ y = -x + 1 \end{cases}$

10. $\begin{cases} y = 7x + 20 \\ 4x - y = -11 \end{cases}$

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11. $\begin{cases} -4x + 3y = 29 \\ 5x + y = -3 \end{cases}$

12. $\begin{cases} x - 3y = 4 \\ 2x - 5y = 8 \end{cases}$

Solve each system by ELIMINATION. Be sure to clearly give the solution.

13. $\begin{cases} y = -2x - 3 \\ y = 7x + 6 \end{cases}$

14. $\begin{cases} x + 3y = 3 \\ x - 5y = -29 \end{cases}$

15. $\begin{cases} 4x + y = 10 \\ 7x + 2y = 17 \end{cases}$

16. $\begin{cases} 3x - 12y = 6 \\ x - 4y = 2 \end{cases}$

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Topic 5: Solving Systems of Equations Applications

17. The sum of two numbers is 75. If the larger number is three more than twice the smaller number, find both numbers.

Variables:	**Solve:**
System:	**Solution:**

18. At the school bookstore, Rylan bought two spiral notebooks and one folder and paid $6.70. Olivia bought three spiral notebooks and five folders and paid $12.85. Find the cost of each folder.

Variables:	**Solve:**
System:	**Solution:**

19. In her last workout, Marsha burned 9 calories per minute on the treadmill and 7 calories per minute on the elliptical. If she spent a total of 57 minutes working out and burned a total of 463 calories, how many minutes did she spend on the elliptical?

Variables:	**Solve:**
System:	**Solution:**

20. A restaurant has booths that can sit four people and tables that can seat six people. In total, the restaurant has 37 seating options and can seat 190 people. Find the number of tables in the restaurant.

Variables:	**Solve:**
System:	**Solution:**

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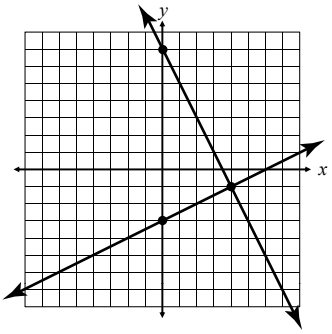
Pre-Algebra Review

QUIZ 6

Name: _____

Date: _____ **Per:** _____

Use the graph to the right for questions 1-2:



1. Which two equations represent this system?

☐ $y = 2x - 3$	☐ $y = -2x + 7$
☐ $y = -\frac{1}{2}x + 7$	☐ $x - 2y = -6$
☐ $x - 2y = 6$	☐ $2x - y = 7$

2. What is the solution to the system? Write your answer in the box.

(☐ , ☐)

3. Three systems of equations are given below. Write the letter of the type of solution that each system has in each box below the system.

$\begin{cases} 3x + 3y = 15 \\ y = -x + 5 \end{cases}$ ☐

$\begin{cases} 3x - y = 5 \\ x - 3y = 15 \end{cases}$ ☐

$\begin{cases} 3x - y = 9 \\ y = 3x + 9 \end{cases}$ ☐

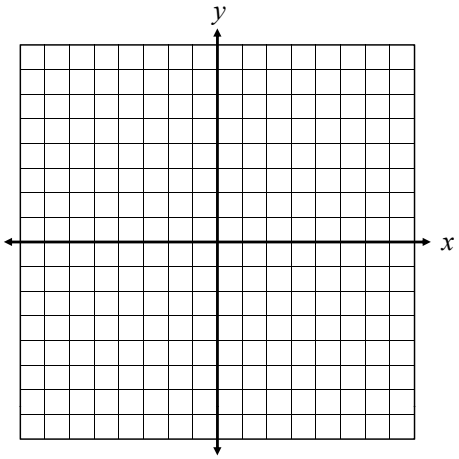
Types of Solutions:

A – One Solution

B – No Solution

C – Infinite Solutions

4. Use the graph below to determine which system of equations would have a solution in the second quadrant.



A. $\begin{cases} y = x - 7 \\ y = -x + 3 \end{cases}$

B. $\begin{cases} y = x - 1 \\ y = -\frac{1}{4}x - 6 \end{cases}$

C. $\begin{cases} y = -x + 2 \\ 4x - y = -7 \end{cases}$

D. $\begin{cases} x + 2y = 14 \\ y = \frac{3}{2}x - 5 \end{cases}$

5. Solve the system of equations algebraically. Write your answer in the box.

$\begin{cases} y = x + 1 \\ y = -4x - 14 \end{cases}$

(☐ , ☐)

6. Find the value of x in the solution to the system of equations shown below.

$\begin{cases} 2x - 5y = 34 \\ y = 3x - 25 \end{cases}$

A. -4

B. 7

C. -7

D. 3

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7. Find the solution to the system of equations.

$$\begin{cases} x - 2y = -20 \\ x - 5y = -47 \end{cases}$$

A. (-2, 9)
B. (2, -9)
C. (9, -2)
D. (-9, 2)

8. Find the solution to the system of equations.

$$\begin{cases} 3x + y = -17 \\ 4x - 9y = -2 \end{cases}$$

A. (2, -5)
B. (-5, 2)
C. (-2, -5)
D. (-5, -2)

9. Find the solution to the system of equations.

$$\begin{cases} 5x - y = -2 \\ y = -5x - 8 \end{cases}$$

A. (-3, -1)
B. (-1, -3)
C. No Solution
D. Infinite Solutions

10. Find the solution to the system of equations.

$$\begin{cases} y = 2x - 8 \\ 6x - 3y = 24 \end{cases}$$

A. (0, 8)
B. (8, 0)
C. No Solution
D. Infinite Solutions

11. A certain airplane offers two types of seats, first class and economy. There are 209 total seats on the airplane. If the difference between the number of economy and first class seats is 153, find the number of economy seats.

A. 28
B. 45
C. 164
D. 181

12. It costs $31.25 for one box of candy and four large bags of popcorn at the movie theater. For three boxes of candy and five large bags of popcorn, it costs $46.50. How much does a large bag of popcorn cost?

A. $4.25
B. $5.50
C. $6.75
D. $7.25

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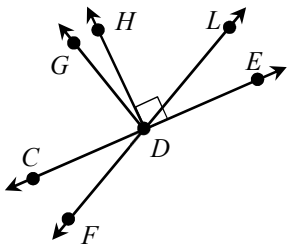
Name: _____ **Pre-Algebra Review:** Packet #7

Topic #1: Basic Angle Relationships

1. Using the diagram below, classify each angle pair as vertical, adjacent, congruent, complementary, or supplementary angles. Use all names that apply.



a) $\angle CDG$ and $\angle GDH$

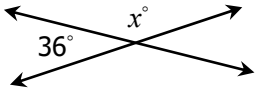
b) $\angle CDL$ and $\angle FDE$

c) $\angle GDH$ and $\angle HDL$

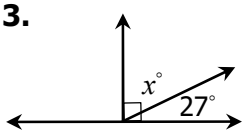
d) $\angle CDF$ and $\angle FDE$

Find the missing measure.

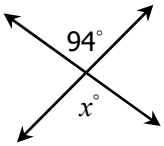
2.



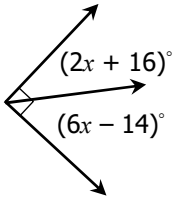
3.



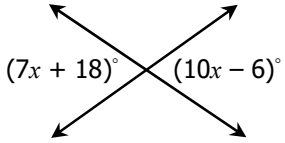
4.



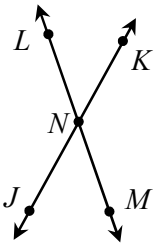
5. Solve for x.



6. Solve for x.



7. If $m\angle LNK = (4x - 9)^\circ$ and $m\angle KNM = (10x - 21)^\circ$, find $m\angle LNJ$.

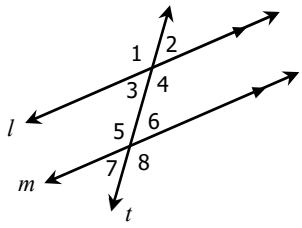


8. If $\angle P$ and $\angle Q$ are supplementary angles and $m\angle Q = 47^\circ$, find $m\angle P$.

9. If $\angle 1$ and $\angle 2$ are vertical angles, $\angle 2$ and $\angle 3$ are complemetary angles, and $m\angle 1 = 26^\circ$, find $m\angle 3$.

Topic #2: Parallel Lines Cut a Transversal

10. Using the diagram below, classify each angle pair as alternate interior, alternate exterior, corresponding, or consecutive interior angles. If no relationship exists, write "none".



a) $\angle 3$ and $\angle 7$

b) $\angle 4$ and $\angle 5$

c) $\angle 4$ and $\angle 6$

d) $\angle 2$ and $\angle 5$

e) $\angle 2$ and $\angle 6$

f) $\angle 1$ and $\angle 8$

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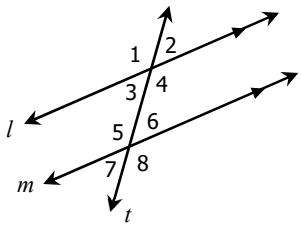
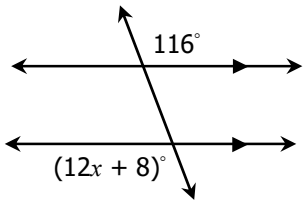
11. In the diagram below, if $m\angle 5 = 118^\circ$, find each angle measure.



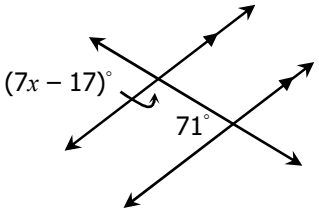
$m\angle 1 =$	$m\angle 6 =$
$m\angle 2 =$	$m\angle 7 =$
$m\angle 3 =$	$m\angle 8 =$
$m\angle 4 =$	

Solve for x.

12.

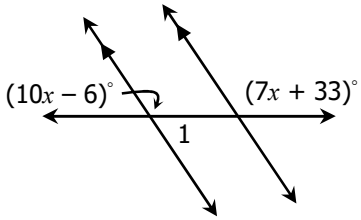


13.

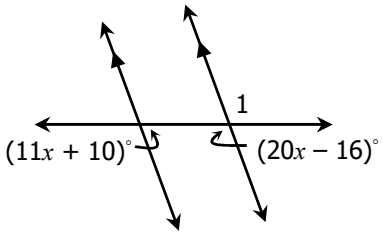


Find $m\angle 1$.

14.



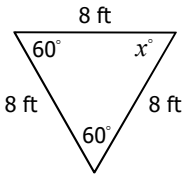
15.



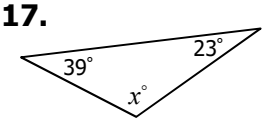
Topic #3: Triangles & The Pythagorean Theorem

Find each missing angle measure, then classify the triangle by its angles and its sides.

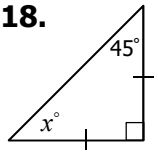
16.



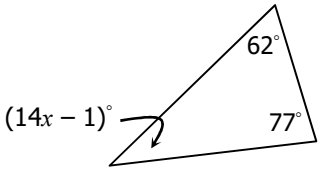
17.



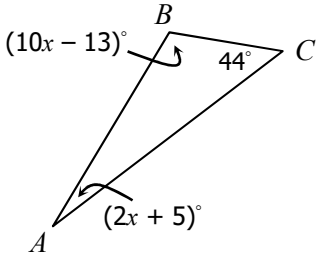
18.



19. Solve for x.



20. Find $m\angle B$.



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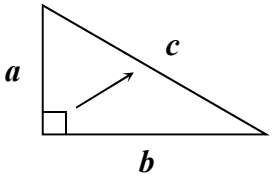
Pythagorean Theorem:

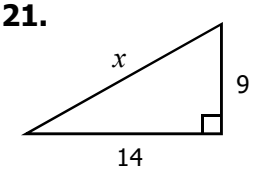


$$\_\_\_\_\_$$

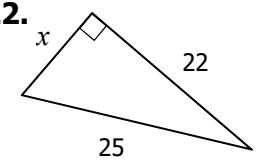
where a and b are the _____ and c, the longest side, is the _____

Find the missing side length. Round to the nearest tenth if necessary.

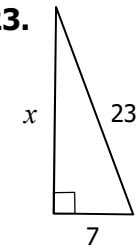
21.



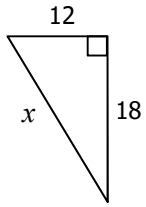
22.



23.



24.



25. Determine whether the side lengths could form a right triangle. Check all that apply.

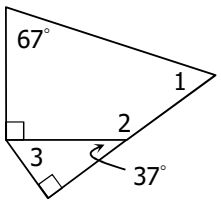
☐ 7, 10, 15 ☐ 16, 30, 32 ☐ 12, 16, 20 ☐ 5, 12, 13 ☐ 18, 25, 31

26. A ship leaves a port and sails eight miles north, then three miles west. If it needs to return to the port, what is the minimum distance it must travel? Round to the nearest tenth of a mile.

27. A 36-foot wire is attached from the top of a pole to a bracket that is 9 feet from the base of the pole. How tall is the pole? Round to the nearest tenth of a foot.

Topic #4: Quadrilaterals

28. Find each angle measure.

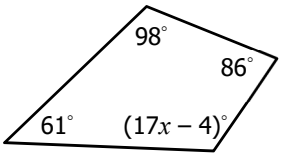


$m\angle 1 =$ _____

$m\angle 2 =$ _____

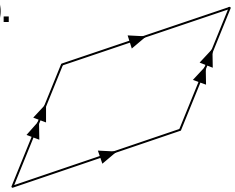
$m\angle 3 =$ _____

29. Solve for x.



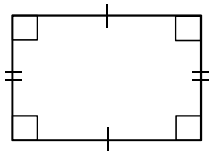
Classify each figure using all names that apply.

30.



- ❑ Quadrilateral
- ❑ Trapezoid
- ❑ Isosceles Trapezoid
- ❑ Parallelogram
- ❑ Rectangle
- ❑ Rhombus
- ❑ Square

31.



- ❑ Quadrilateral
- ❑ Trapezoid
- ❑ Isosceles Trapezoid
- ❑ Parallelogram
- ❑ Rectangle
- ❑ Rhombus
- ❑ Square

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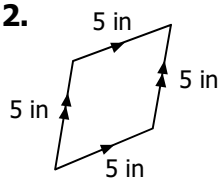
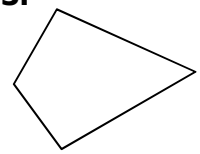
Classify each figure using the name that best describes it.

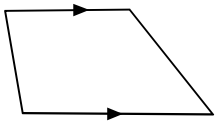
32.



33.



34.



Determine if the statement is always, sometimes, or never true.

35. A rectangle is a square.

36. A quadrilateral is a parallelogram.

37. An trapezoid is a rhombus.

38. A square is a rhombus.

Topic #5: Polygons

Formula for the sum of the measures of the interior angles of polygon:

n = _____

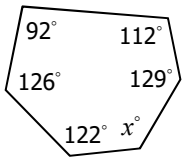
39. Find the sum of the measures of the interior angles of each polygon.

a) heptagon

b) 16-gon

c) 35-gon

40. Find the measure of the missing angle.

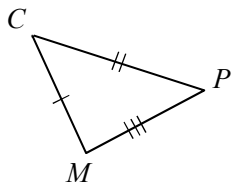


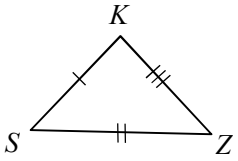
41. A nonagon has interior angles that measure 121°, 155°, 146°, 139°, 140°, 159°, 134°, and 148°. Find the measure of the remaining angle.

42. If parallelogram $PQRS \cong$ parallelogram $TUVW$, identify the congruent parts.

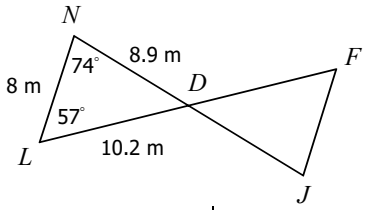
$\angle P \cong$	$\overline{TU} \cong$
$\angle Q \cong$	$\overline{VW} \cong$
$\angle R \cong$	$\overline{TW} \cong$
$\angle S \cong$	$\overline{UV} \cong$

43. If the triangles below are congruent, write a valid congruency statement.



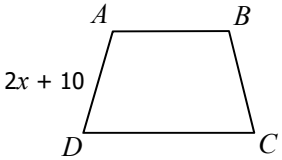


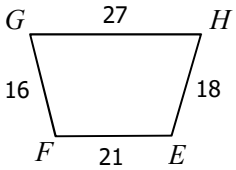
44. If $\Delta LND \cong \Delta FJD$, find each measure.



$m\angle FDJ =$	$DF =$
$m\angle F =$	$FJ =$
$m\angle J =$	$DJ =$

45. If trapezoid $ABCD \cong$ trapezoid $EFGH$, find the value of x.





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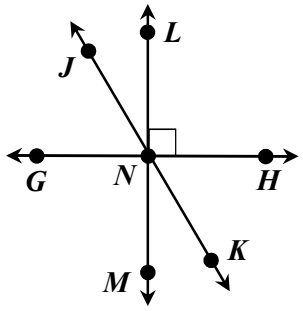
Pre-Algebra Review

QUIZ 7

Name: _____

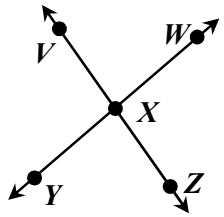
Date: _____ **Per:** _____

1. Which of the following describes $\angle JNL$ and $\angle MNK$? Check all that apply.

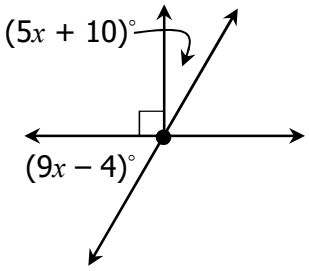


- ☐ Vertical
- ☐ Adjacent
- ☐ Complementary
- ☐ Supplementary
- ☐ Congruent

2. If $m\angle VXY = 94^\circ$, find the measure of $\angle YXZ$. Write your answer in the box.



3. Find the value of x.



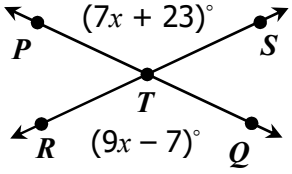
A. 3.5

B. 6

C. 8

D. 12.5

4. Find $m\angle STQ$.



A. 52°

B. 64°

C. 116°

D. 128°

5. If $\angle A$ is complementary to $\angle B$, $\angle B$ is supplementary to $\angle C$, and $m\angle A = 59^\circ$, find $m\angle C$.

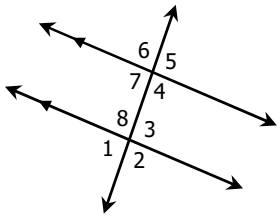
A. 31°

B. 109°

C. 121°

D. 149°

6. Given the diagram below, name a pair of corresponding angles. Write your answers in the boxes.



∠ **and** ∠

7. Using the diagram above, if $m\angle 4 = 82^\circ$, which of the following describes the relationship between angles 4 and 8, and gives the measure of $\angle 8$?

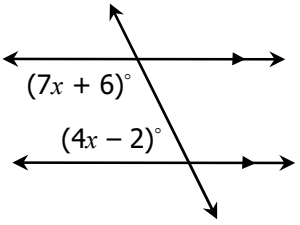
A. Alternate Interior Angles; $m\angle 8 = 82^\circ$

B. Alternate Interior Angles; $m\angle 8 = 98^\circ$

C. Consecutive Interior Angles; $m\angle 8 = 82^\circ$

D. Consecutive Interior Angles; $m\angle 8 = 98^\circ$

8. Find the value of x. Write your answer in the box.



x =

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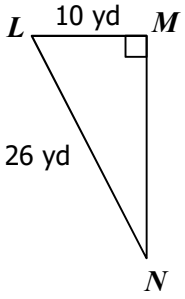
9. What is the length of $\overline{MN}$?



A. 16 yd
B. 22 yd
C. 24 yd
D. 36 yd

10. Starting from a tree, Cole and Logan run 24 feet south. Then, Cole runs 18 feet east while Logan runs 45 feet west, then they both stop. How many feet closer to the tree is Cole than Logan?

A. 18 ft
B. 21 ft
C. 27 ft
D. 30 ft

11. A fireman has a 28-foot ladder. In order to reach a point 25 feet up a building, about how far away from the building should he place the bottom of the ladder?

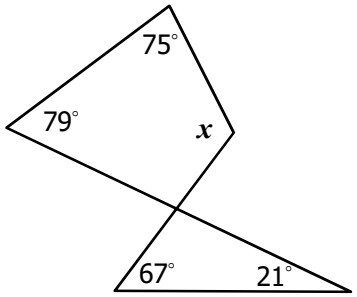
A. 10.9 ft
B. 11.2 ft
C. 11.8 ft
D. 12.6 ft

12. Given the side lengths of three triangles below, determine which statement is true.

Triangle A	20 cm, 21 cm, 29 cm
Triangle B	12 cm, 18 cm, 30 cm
Triangle C	9 cm, 40 cm, 41 cm

A. Triangles A and B are right triangles.
B. Triangles A and C are right triangles.
C. Triangles B and C are right triangles.
D. Triangles A, B, and C are right triangles.

13. Find $m\angle x$.



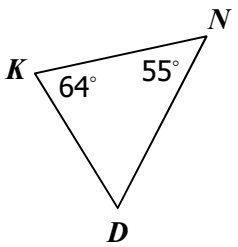
A. 114°
B. 118°
C. 121°
D. 123°

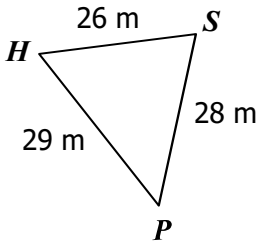
14. Which of the following statements describe a rhombus? Check all that apply.

- ☐ It has four congruent angles.
- ☐ It has four congruent sides.
- ☐ It is always a square.
- ☐ It is sometimes a quadrilateral.
- ☐ It is always a parallelogram.
- ☐ It is sometimes a rectangle.

15. If a polygon has 14 sides, find the sum of the measures of its interior angles. Write your answer in the box.

16. If $\Delta KND \cong \Delta SPH$, which correctly gives the measure of $\angle H$ and the length of $\overline{KN}$?





A. $m\angle H = 64°$; $KN = 29$ m
B. $m\angle H = 61°$; $KN = 29$ m
C. $m\angle H = 64°$; $KN = 28$ m
D. $m\angle H = 61°$; $KN = 28$ m

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Name: _____ **Pre-Algebra Review:** Packet #8

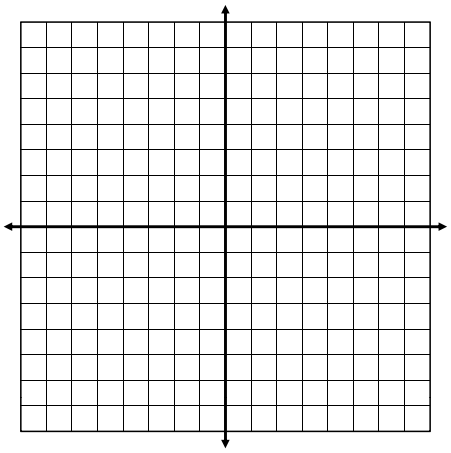
Topic #1: Transformations

For each transformation, describe what it is and draw a picture as a visual.			
REFLECTION	**TRANSLATION**	**ROTATION**	**DILATION**

Topic #2: Reflections

Graph and label each figure and its image under the reflection in the given line. Then, give the new coordinates.

1. Trapezoid $PQRS$ with vertices $P(-3, 1)$, $Q(0, 7)$, $R(5, 4)$, and $S(4, 2)$; **x-axis**



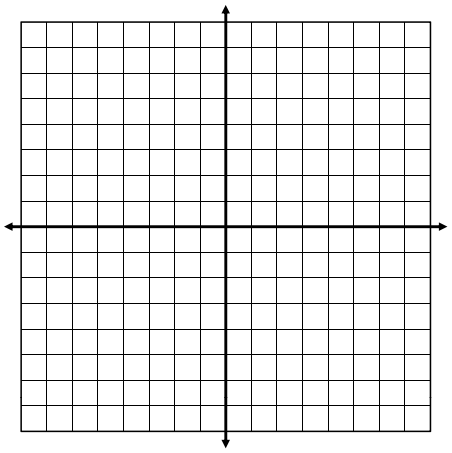
P' (____, ____)

Q' (____, ____)

R' (____, ____)

S' (____, ____)

2. Triangle XYZ with vertices $X(5, -2)$, $Y(6, -5)$, and $Z(1, -6)$; **y-axis**



X' (____, ____)

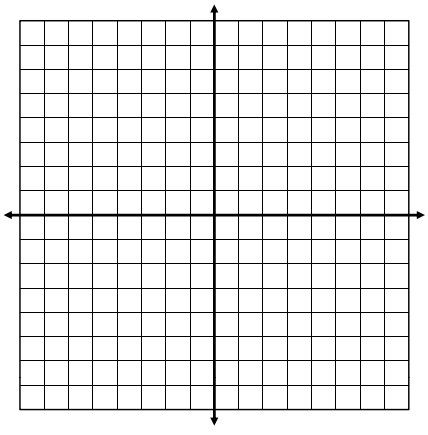
Y' (____, ____)

Z' (____, ____)

Topic #3: Translations

Graph and label each figure and its image under the given translation rule. Then, give the new coordinates.

3. Rectangle $ABCD$ with vertices $A(-7, 2)$, $B(-4, 3)$, $C(-1, -6)$, and $D(-4, -7)$; translated along the rule **$(x, y) \rightarrow (x + 9, y + 5)$**



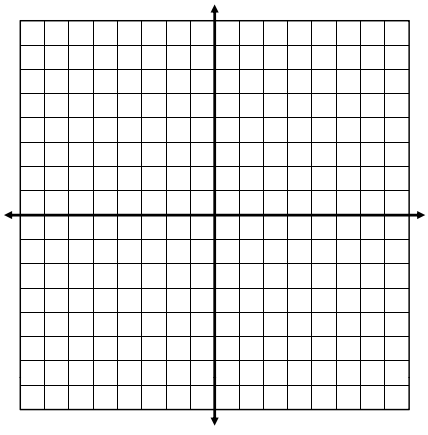
A' (____, ____)

B' (____, ____)

C' (____, ____)

D' (____, ____)

4. Quadrilateral $JKLM$ with vertices $J(-3, 2)$, $K(1, 6)$, $L(5, 0)$, and $M(-3, -5)$; translated along the rule **$(x, y) \rightarrow (x + 3, y - 1)$**



J' (____, ____)

K' (____, ____)

L' (____, ____)

M' (____, ____)

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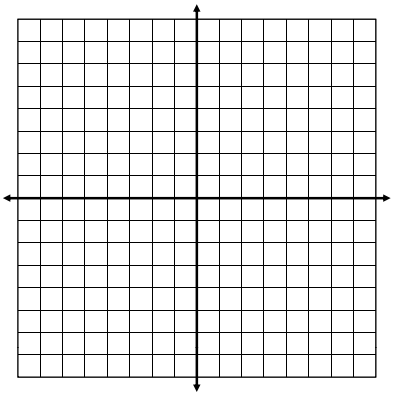
Topic #4: Translations

Complete each rule for counterclockwise rotations about the origin.

90°	**180°**	**270°**
$(x, y) \rightarrow$ _____	$(x, y) \rightarrow$ _____	$(x, y) \rightarrow$ _____

Graph and label each figure and its image under the given rotation. Then, give the new coordinates. Assume all rotations are about the origin.

5. Triangle DEF with vertices $D(1, 2)$, $E(2, 7)$, and $F(8, 3)$; **90° counterclockwise rotation**

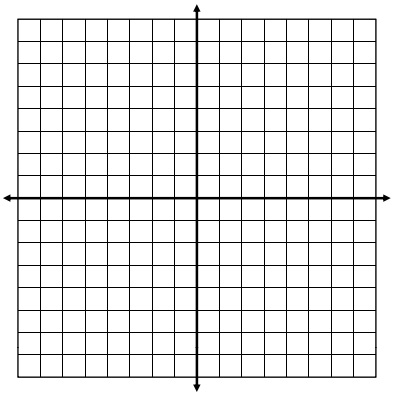


D' (____, ____)

E' (____, ____)

F' (____, ____)

6. Parallelogram $STUV$ with vertices $S(-7, 5)$, $T(-1, 7)$, $U(-2, 3)$, and $V(-8, 1)$; **180° rotation**



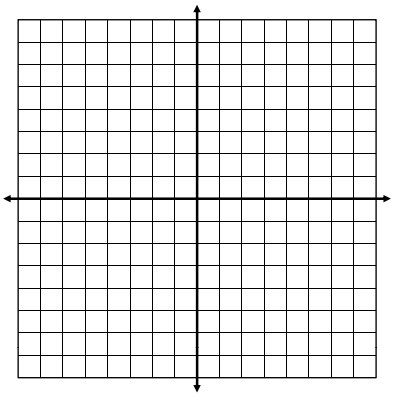
S' (____, ____)

T' (____, ____)

U' (____, ____)

V' (____, ____)

7. Triangle GHI with vertices $G(-8, -4)$, $H(-4, -2)$, and $I(-1, -6)$; **270° counterclockwise rotation**

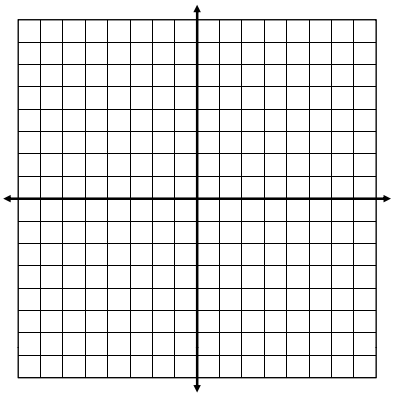


G' (____, ____)

H' (____, ____)

I' (____, ____)

8. Rhombus $BCDE$ with vertices $B(2, -1)$, $C(7, 0)$, $D(6, -5)$, and $E(1, -6)$; **90° clockwise rotation**



B' (____, ____)

C' (____, ____)

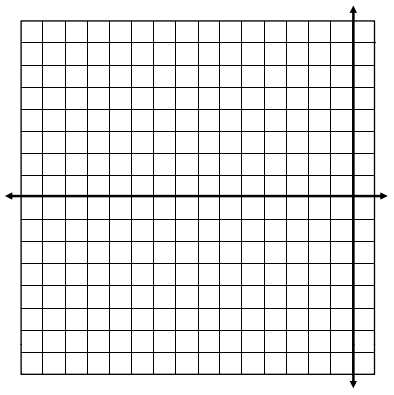
D' (____, ____)

E' (____, ____)

Topic #5: Dilations

Graph and label each figure and its image under the dilation with the given scale factor, k. Then, give the new coordinates.

9. Quadrilateral $QUAD$ with vertices $Q(-7, 2)$, $U(-4, 3)$, $A(0, 1)$, and $D(-2, -4)$; $k = 2$



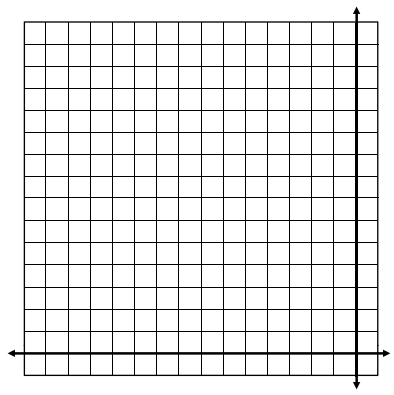
Q' (____, ____)

U' (____, ____)

A' (____, ____)

D' (____, ____)

10. Square $ABCD$ with vertices $A(-15, 10)$, $B(-5, 15)$, $C(0, 5)$, and $D(-10, 0)$; $k = 4/5$



A' (____, ____)

B' (____, ____)

C' (____, ____)

D' (____, ____)

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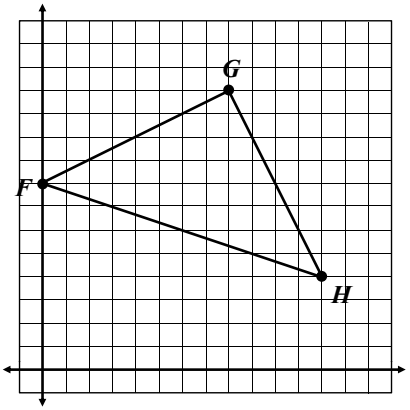
11. Graph the image of the triangle below using a scale factor of $k = 1/4$.

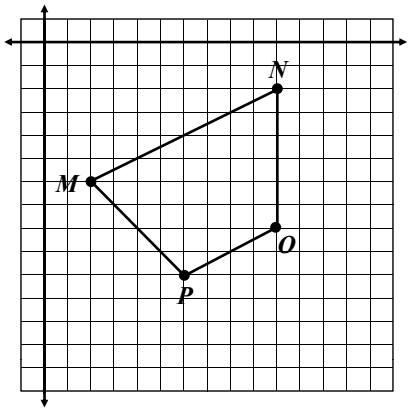


F' (____, ____)

G' (____, ____)

H' (____, ____)

12. Graph the image of the trapezoid below using a scale factor of $k = 3/2$.



M' (____, ____)

N' (____, ____)

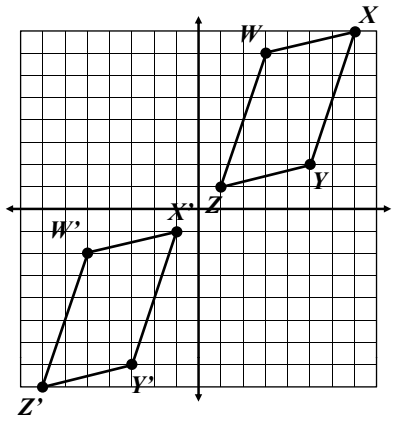
O' (____, ____)

P' (____, ____)

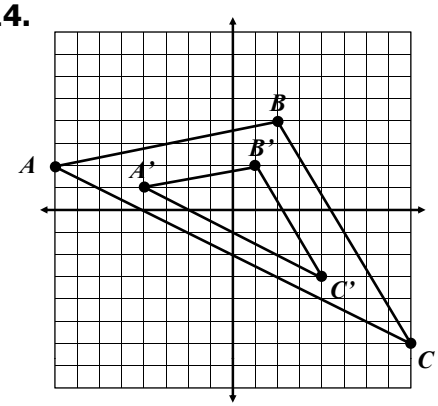
Topic #6: Identifying Transformations and Writing Rules

Determine the type of transformation and write a rule.

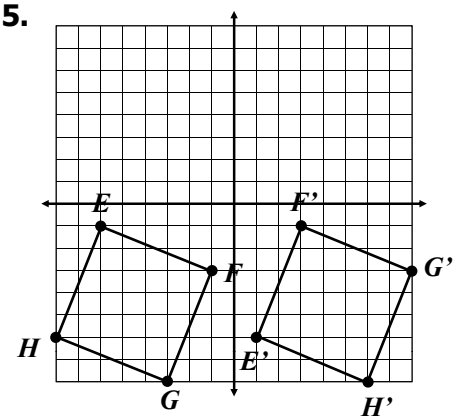
13.



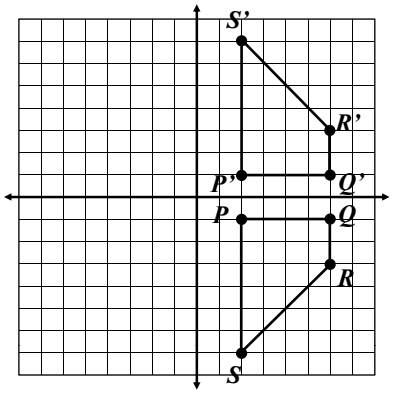
14.



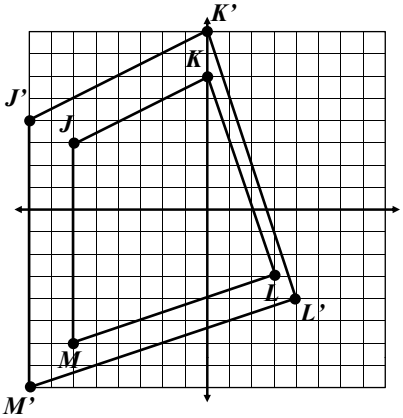
15.



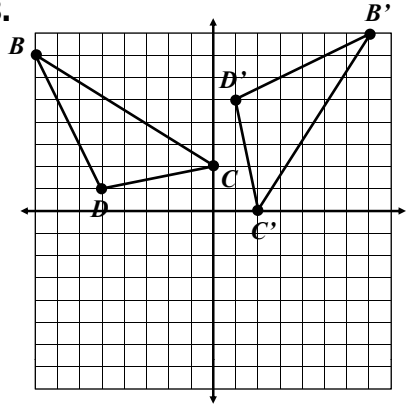
16.



17.



18.



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Pre-Algebra Review

QUIZ 8

Name: _____

Date: _____ **Per:** _____

1. If ΔLMN with vertices L(-7, -2), M(-1, -5), and N(-6, -8) is reflected along the y-axis, what will be the coordinates of $L'M'N'$?

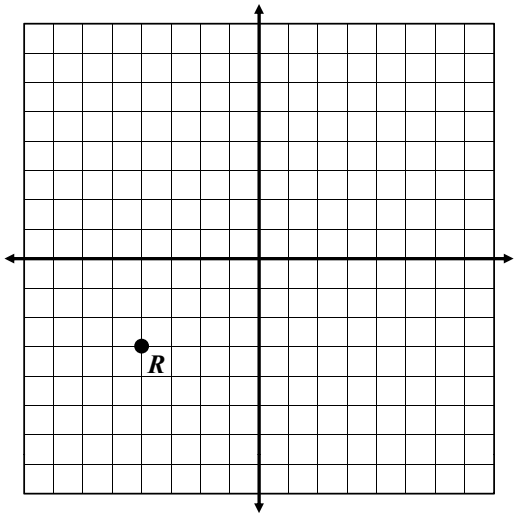
A. L'(-7, 2), M'(-1, 5), N'(-6, 8)

B. L'(7, -2), M'(1, -5), N'(6, -8)

C. L'(7, 2), M'(1, 5), N'(6, 8)

D. L'(-2, -7), M'(-5, -1), N'(-8, -6)

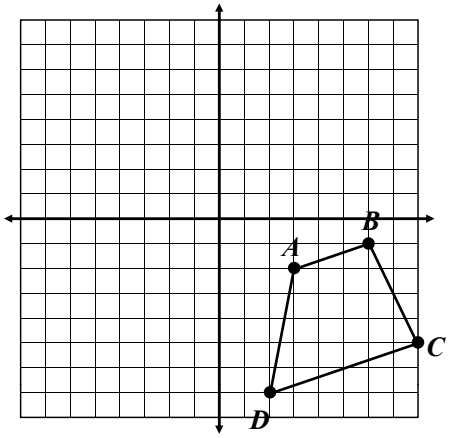
2. If point R shown below is rotated 270° counterclockwise about the origin, what will be the coordinates of R'? Give your answer by plotting the point on the grid.



3. Which transformations result in congruent figures? Check all that apply.

- ☐ Reflections
- ☐ Rotations
- ☐ Translations
- ☐ Dilations

4. Trapezoid $ABCD$ is shown below. Which transformation will result in an image that lies completely within the first quadrant? Check all that apply. Assume all rotations are about the origin.



- ☐ A reflection in the x-axis.
- ☐ A reflection in the y-axis.
- ☐ A 90° counterclockwise rotation.
- ☐ A 180° rotation.
- ☐ A 270° clockwise rotation.
- ☐ Translation along the rule $(x, y) \rightarrow (x - 1, y + 9)$.

5. If ΔWXY with vertices W(4, 2), X(6, 10), and Y(8, 4) is dilated using a scale factor of 2, what will be the coordinates of $W'X'Y'$?

A. W'(2, 1), X'(3, 5), Y'(4, 2)

B. W'(6, 4), X'(8, 12), Y'(10, 6)

C. W'(8, 4), X'(12, 20), Y'(16, 8)

D. W'(8, 2), X'(16, 10), Y'(16, 4)

6. Which pair of points represent a 180° degree rotation around the origin?

A. A'(2, 6) and A'(-6, -2)

B. B'(-1, -3) and B'(3, -1)

C. C'(-4, -5) and C'(-5, 4)

D. D'(7, -2) and D'(-7, 2)

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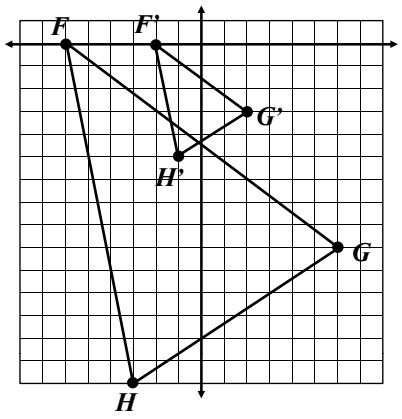
7. Identify the scale factor that was used to graph $\Delta F'G'H$.



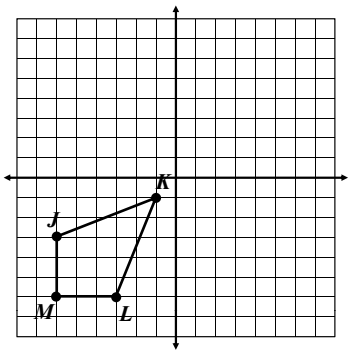
A. 3

B. 4

C. $\frac{1}{3}$

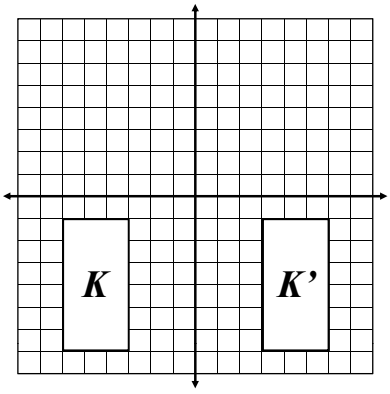
D. $\frac{1}{4}$

8. If the figure below is reflected in the x-axis, then translated along the rule $(x, y) \rightarrow (x + 1, y - 2)$, what will be the coordinates of the point J'? Write the coordinates in the boxes.



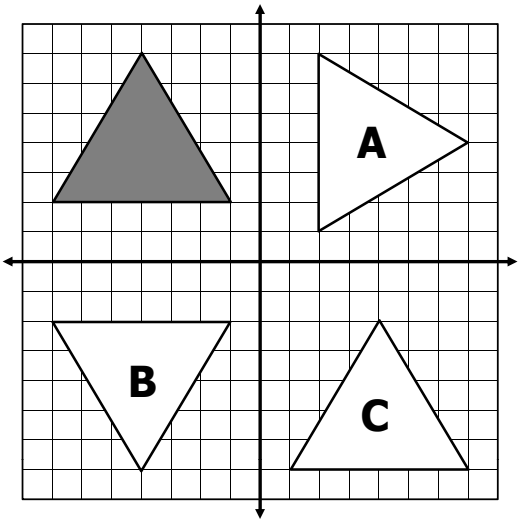
(☐ , ☐)

9. Which transformations could move rectangle K to rectangle K' in one single step? Check all that apply.



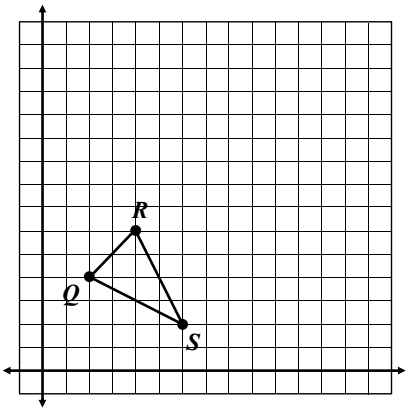
- ☐ A reflection in the x-axis.
- ☐ A reflection in the y-axis.
- ☐ A rotation about the origin.
- ☐ A translation.

10. Which triangles show a translation of the shaded triangle? Check all that apply.



- ☐ Triangle A
- ☐ Triangle B
- ☐ Triangle C

11. If the triangle below is dilated using a scale factor of 5/2, what will be the coordinates of S'? Write the coordinates in the boxes.



(☐ , ☐)

12. The coordinates of ΔTUV and its image after a transformation are given below. Identify the transformation.

ΔTUV	$T(-5, 4)$, $U(-1, 2)$, $V(0, -7)$
$\Delta T'U'V'$	$T'(4, 5)$, $U'(2, 1)$, $V'(-7, 0)$

A. A reflection in the x-axis.

B. A reflection in the y-axis.

C. A 90° counterclockwise rotation about the origin.

D. A 90° clockwise rotation about the origin.

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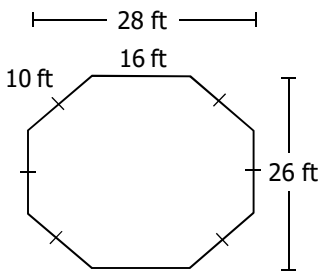
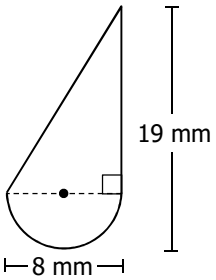
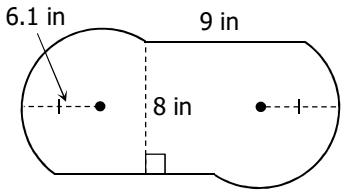
Name: _____ **Pre-Algebra Review:** Packet #9

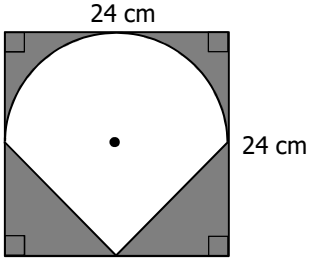
Topic #1: Perimeter & Area of Composite Figures

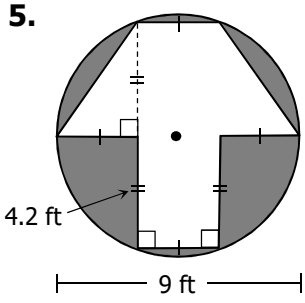
Find the perimeter and area of each composite figure. Round to the nearest tenth if necessary.

Figure	Perimeter	Area
1. 		
2. 		
3. 		

Topic #2: Area of Shaded Regions

Find the area of the shaded region. Round to the nearest tenth if necessary.

4. 

5. 

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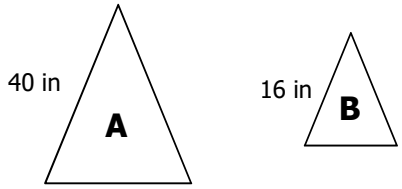
Topic #3: Area & Perimeter of Similar Figures

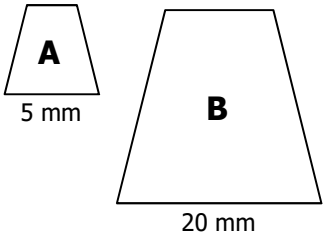
Assume each pair of figures below are similar.

6. Give the scale factor, perimeter ratio, and area ratio of Figure A to Figure B.

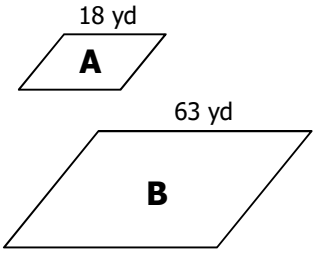


Scale Factor	Perimeter Ratio	Area Ratio

7. If the perimeter of Figure B is 84 millimeters, find the perimeter of Figure A.



8. If the area of Figure A is 216 square yards, find the area of Figure B.

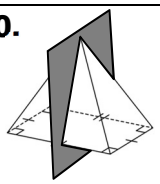


9. The area of Triangle A is 128 m^2 and the area of Triangle B is 72 m^2. If the triangles are similar and the height of Triangle B is 20 m, find the height of Triangle A.

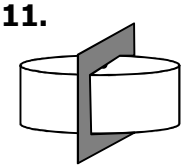
Topic #4: 3D Figures & Cross Sections

Draw and describe the cross section that results from each slice.

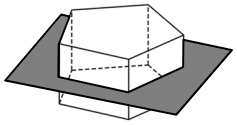
10.



11.



12.



Topic #5: Volume & Surface Area of 3D Figures

Find the volume and surface area of each solid. Round to the nearest tenth if necessary.

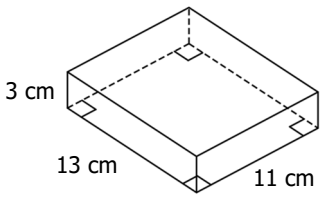
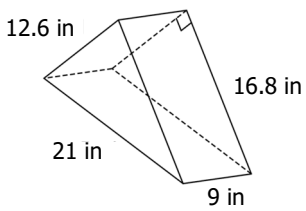
Figure	Volume	Surface Area
13. 		
14. 		

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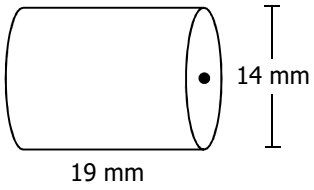
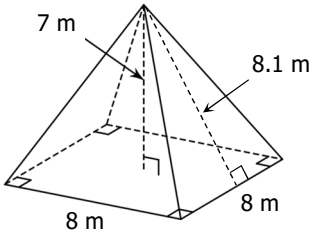
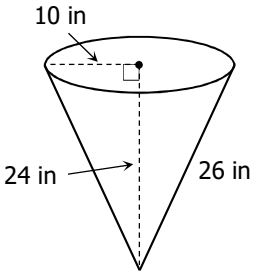
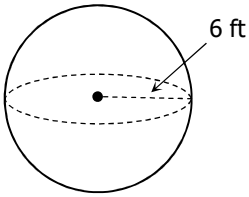
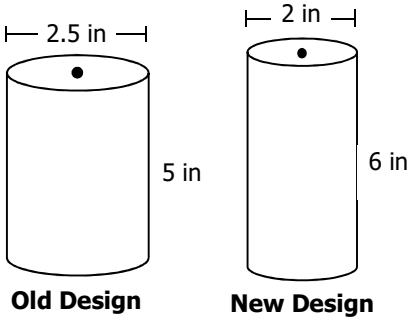
Figure	Volume	Surface Area
15. 		
16. 		
17. 		
18. 		

Topic #6: Volume & Surface Area Applications

19. A certain soda currently comes in the can on the left. To save on aluminum, the company that makes the soda is considering switching to the can on the right. How much aluminum will they save per can?



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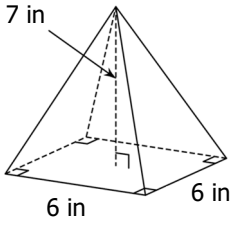
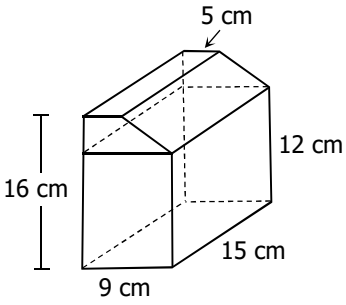
20. A wax candle is made in the shape of a square base pyramid with dimensions shown below. If the wax burns at a rate of four cubic inches every five hours, how many hours will the candle last?



21. If a cone with a height of 12 meters has a volume of 314.16 cubic meters, find the diameter of the cone.

22. Find the total volume of the figure below.



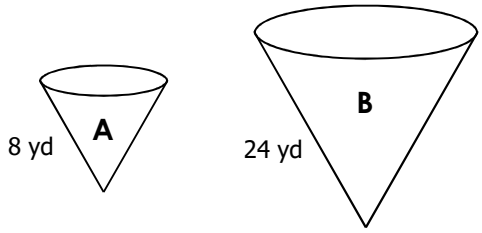
23. If the height of a cylinder is multiplied by four, how will it affect its volume?

24. If the radius of a cylinder is multiplied by 1/4, how will it affect its volume?

Topic #7: Volume & Surface Area of Similar Solids

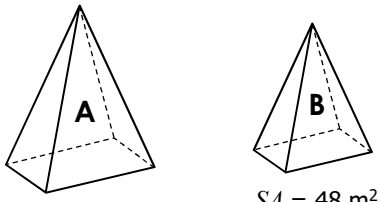
Assuming each pair of solids are similar, give the scale factor, surface area ratio, and volume ratio of Solid A to Solid B.

25.



Scale Factor	Surface Area Ratio	Volume Ratio

26.



$SA = 75\ m^2$ $SA = 48\ m^2$

Scale Factor	Surface Area Ratio	Volume Ratio

27. The volume of Cylinder A is 189 ft^3 and the volume of Cylinder B is 56 ft^3. If the cylinders are similar, what is the ratio of surface area of Cylinder A to the surface area of Cylinder B?

28. The surface area of Prism A is 60 cm^2 and the surface area of Prism B is 735 cm^2. If the prisms are similar and the height of Prism B is 28 cm, find the height of Prism B.

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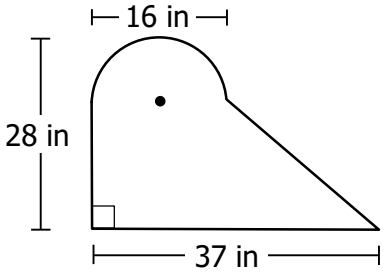
Pre-Algebra Review

QUIZ 9

Name: _____

Date: _____ **Per:** _____

Use the figure below for questions 1 and 2.



1. Find the area of the figure to the nearest tenth of a square inch.

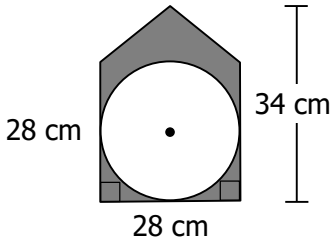
A. 630.5 in^2
B. 731.1 in^2
C. 930.1 in^2
D. 1,334.2 in^2

2. Find the perimeter of the figure to the nearest tenth of an inch.

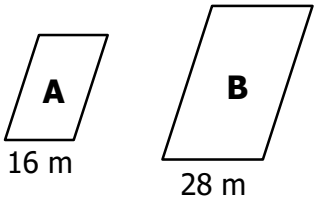
A. 116.8 in
B. 97.1 in
C. 111.1 in
D. 136.3 in

3. Find the area of the shaded region to the nearest tenth of a centimeter.

A. 220.4 cm^2
B. 252.2 cm^2
C. 264.8 cm^2
D. 279.1 cm^2



4. The parallelograms below are similar. Give the ratio of the area of Parallelogram A to the area of Parallelogram B in simplest form. Write your answer in the boxes.



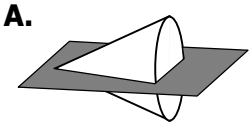
☐ : ☐

5. The area of Triangle A is 261 feet and the area of Triangle B is 116 feet. If the perimeter of Triangle B is 32 square feet, find the perimeter of Triangle A.

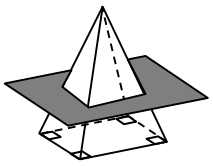
A. 39 ft
B. 42 ft
C. 45 ft
D. 48 ft

6. Which shape does not have a triangular cross section?

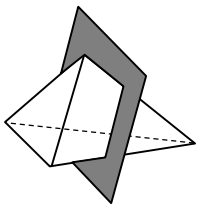
A.



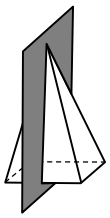
C.



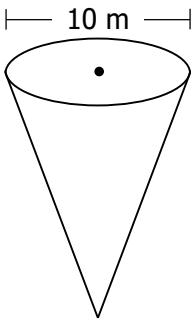
B.



D.



7. If the height of the cone shown below is one less than three times its radius, find the volume of the cone to the nearest cubic meter.



A. 324.1 m^3
B. 366.5 m^2
C. 1,794.2 m^2
D. 3,036.9 m^2

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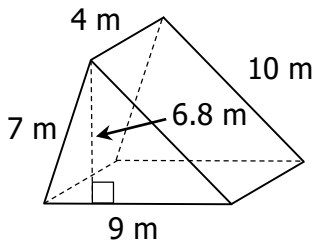
8. Find the surface area of the figure below.

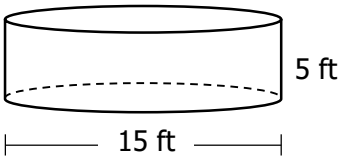


A. 149.5 m^2
B. 154.8 m^2
C. 165.2 m^2
D. 171.9 m^2

9. Find the volume of a sphere with a radius of 12 inches to the nearest tenth of a cubic inch.

A. 603.2 in^3
B. 904.8 in^3
C. 1,583.2 in^3
D. 7,238.2 in^3

10. Find the surface area of the cylinder below to the nearest tenth of a square foot.

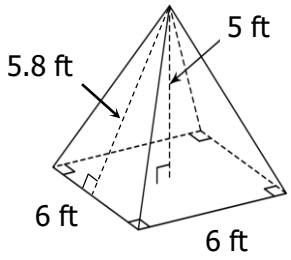


A. 589.0 ft^2
B. 610.4 ft^2
C. 790.8 ft^2
D. 1,885.0 ft^2

11. A sandbox in the shape of a rectangular prism is 7 feet long, 5 feet wide, and 1 foot tall. If six inches is added to the height, how much more sand can it hold?

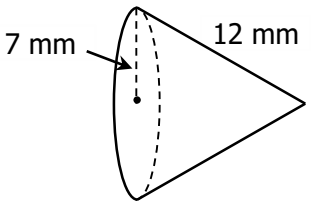
A. 12 ft^3
B. 15 ft^3
C. 17.5 ft^3
D. 21 ft^3

12. Randy is making a hollow square base pyramid out of wood to be used as a prop in a musical. If he has 200 square feet of wood available, how much material will he have left after constructing the pyramid?



A. 130.4 ft^2
B. 140 ft^2
C. 104 ft^2
D. 94.4 ft^2

13. Find the surface area the cone below to the nearest tenth of a square millimeter.



A. 396.4 mm^2
B. 417.8 mm^2
C. 452.3 mm^2
D. 481.7 mm^2

14. The radius of a cylinder is 2 feet. How will the volume of the cylinder be affected if 4 feet is added to the radius?

A. The volume will multiply by 2.
B. The volume will multiply by 3.
C. The volume will multiply by 8.
D. The volume will multiply by 9.

15. Pyramid A is similar to Pyramid B. If the ratio of their volumes is 64:1, what is the ratio of the height of Pyramid A to the height of Pyramid B?

A. 2:1
B. 4:1
C. 8:1
D. 16:1

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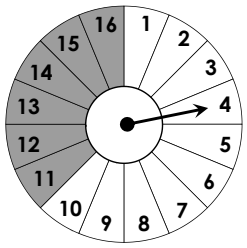
Name: _____ **Pre-Algebra Review:** Packet #10

Topic #1: Theoretical & Experimental Probability

1. If the spinner below is spun once, find each probability. Give each answer as a fraction in simplest form.



a) $P(12)$

b) P(greater than 7)

c) P(shaded)

d) P(prime number or multiple of 4)

2. The spinner above was spun 100 times. The results from the experiment are shown in the table below.

Result	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Frequency	8	4	7	10	5	7	4	9	8	6	5	7	3	8	6	3

a) Based on the experiment, what is the probability of spinning an even number? Compare this to the theoretical probability.

b) Based on the experiment, what is the probability of spinning a number that is at most 12? Compare this to the theoretical probability.

c) Theoretically, if the spinner is spun 250 times, how many times would you expect it to land on a number that is even and a perfect square?

d) Based on the experiment, if the spinner is spun 250 times, how many times would you expect it to land on a number that is even and a perfect square?

3. The table below shows the results of Tom's last four rounds (72 holes) of golf.

Result	**Frequency**
Bogie	16
Par	32
Birdie	18
Eagle	2
Hole-in-One	0
Other	4

a) Based on Tom's record, find the probability that he gets a birdie on his next hole.

b) If Tom plays 12 rounds (216 holes) of golf this summer, how many times would you expect him to par the hole?

Topic #2: Counting Outcomes

4. Students who buy their lunch in the cafeteria can choose from a ham sandwich, a turkey sandwich, or a grilled cheese sandwich. For a side, they can choose fruit, yogurt, or a salad. For a drink, they can choose juice or milk. How many ways can they choose one sandwich, one side, and one drink?

5. How many raffle ticket numbers are possible if they contain two letters followed by three digits?

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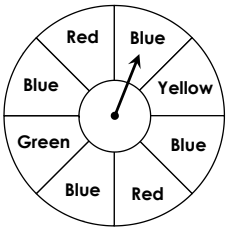
6. If Sarah picks one card at random from a standard deck and then chooses one letter from the alphabet, how many outcomes are possible?	**7.** Doug decided to guess on the last three multiple choice questions on his science test. If each question had four choices, how many ways can he answer the questions?

Topic #3: Compound Probability

8. If the spinner below is spun twice, find each probability.



a) P(red, then green)

b) P(yellow, then blue)

c) P(blue both times)

9. There are 13 girls and 15 boys in a math class. The teacher chooses a student at random, then rolls a standard die. Find the probability of choosing a boy then rolling a number that is at most 4.

10. Karen is flying from Orlando to Baltimore, then Baltimore to Boston. The first flight has been delayed six times in the past fourteen days and the second flight has been delayed eight times in the past twelve days, what is the probability that both flights will be delayed on the day Karen flies?

11. A piggy bank contains four pennies, six nickels, ten dimes, and five quarters. A coin is drawn at random, not replaced, then another is drawn. Find each probability.

a) P(nickel, then quarter)

b) P(penny, then not a dime)

c) P(both dimes)

d) P(both nickels)

Topic #4: Measures of Center, Range, Mean Absolute Deviation

Find the mean, median, mode, and range of each data set.

12. The distance, in yards, of each successful field goal attempt made by a kicker in his last practice: {42, 40, 36, 52, 43, 59, 45, 36, 52}

Mean	Median	Mode(s)	Range

13. The number of minutes that Ed, a customer support specialist, has spent on his last twelve phone calls: {18, 5, 24, 20, 16, 7, 28, 35, 12, 24, 20, 43}

Mean	Median	Mode(s)	Range

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Find the mean absolute deviation of each data set. Round to the nearest tenth if necessary.

14. The number of grams of fat in eight different candy bars: {11, 14, 8, 7, 6, 11, 10, 13}

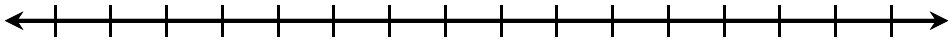
15. The number of graduating seniors in years since 2012.

Year	Seniors
2012	379
2013	402
2014	388
2015	396
2016	410

Topic #5: Box-and-Whisker Plots

Find the five-number summary and construct the box-and-whisker plot for each data set.

16. The mileage, in thousands of miles, of 10 cars in a used car lot: {54, 78, 110, 36, 68, 82, 60, 95, 90, 72}



Minimum: _____

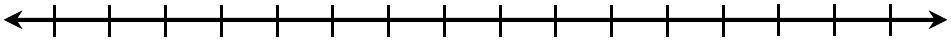
Lower Quartile: _____

Median: _____

Upper Quartile: _____

Maximum: _____

17. The ages of each player on a basketball team: {29, 33, 22, 27, 28, 28, 25, 32, 32, 29, 33, 25, 23, 24, 24}



Minimum: _____

Lower Quartile: _____

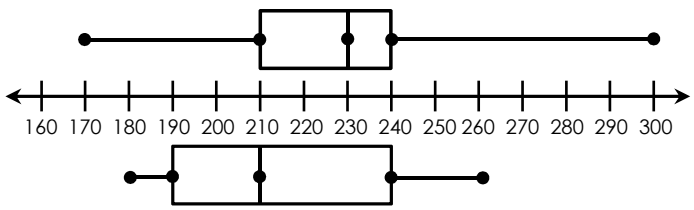
Median: _____

Upper Quartile: _____

Maximum: _____

18. Waterstone Crossing and Kingston Estates are two neighborhoods in the same city. Last year, 8 homes sold in Waterstone Crossing and 12 homes sold in Kingston Estates. Each home sold at a different price. The selling prices, in thousands of dollars, for each home are shown below.

Waterstone Crossing



Kingston Estates

a) Which neighborhood had a greater interquartile range in selling prices?

b) What is the difference in the median selling price between neighborhoods?

c) What percent of the homes in Waterstone Crossing sold for at least $240,000?

d) How many homes in the two neighborhoods combined sold for more than $210,000?

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Topic #6: Scatter Plots & Line of Best Fit

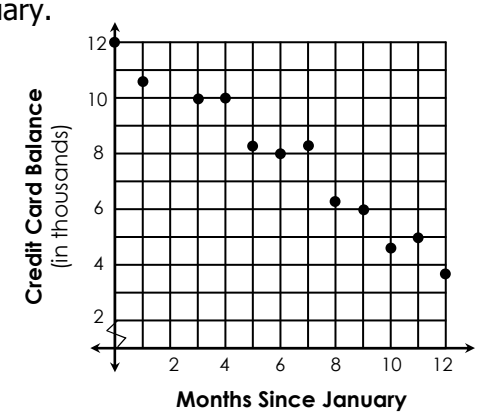
Determine whether the data would have a positive, negative, or no relationship.

19. A racers bib number in a marathon versus their finish time.

20. The number of passengers on a flight versus the number of suitcases checked.

21. The number of miles driven versus the amount of gas left in the tank.

22. Gavin's New Year's resolution was to pay off the balance on his credit card. The graph below shows the balance on the card each month since January.



a) Which line best represents this data?

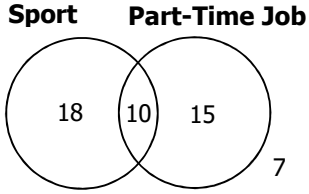
A) $y = \frac{2}{3}x + 12$ **C)** $y = -\frac{2}{3}x + 12$

B) $y = \frac{3}{2}x + 12$ **D)** $y = -\frac{3}{2}x + 12$

b) Using the line of best fit from part a, predict the balance on Gavin's credit balance 15 months after January.

Topic 7: Two-Way Tables

23. The Venn diagram below shows the results of a survey in which a group of students were asked if they play a sport or have a part-time job.



	Sport	No Sport	Total
Job			
No Job			
Total			

24. The partial table below shows the the results of a survey in which sixth, seventh, and eighth grade students were asked if they have a cell phone. Answer the questions to the right.

	Grade 6	Grade 7	Grade 8	Total
Phone		32	40	
No Phone		28		54
Total	42		48	150

a) How many eighth grade students do not have a cell phone?

b) How many sixth grade students have a cell phone?

25. Complete a relative frequency table using the data from question 24. Round to the nearest hundredth if necessary. Then answer the questions to the right.

	Grade 6	Grade 7	Grade 8	Total
Phone				
No Phone				
Total				

a) What percent of the students surveyed do not have a cell phone?

b) What percent of the students surveyed are seventh graders with a cell phone?

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Pre-Algebra Review

QUIZ 10

Name: _____

Date: _____ **Per:** _____

Use for questions 1-2: A deck of cards has an equal number of hearts, diamonds, spades, and clubs. Alex conducted an experiment in which he drew a card at random 60 times. Each time he drew a card, he replaced it before drawing the next card. The results of the experiment are shown below.

Result	Frequency
Heart	15
Diamond	9
Spade	16
Club	20

1. If Alex draws another card, which statement is true regarding the probability he will draw a spade based on this experiment?

A. $\frac{3}{10}$; less than theoretically expected

B. $\frac{4}{15}$; less than theoretically expected

C. $\frac{3}{10}$; more than theoretically expected

D. $\frac{4}{15}$; more than theoretically expected

2. If Alex draws a card at random 400 times, which of the following statements is true regarding the number of times he should expect to get a heart or a diamond based on the experiment?

A. 40 times less than theoretically expected

B. 40 times more than theoretically expected

C. 50 times less than theoretically expected

D. 50 times more than theoretically expected

3. There are 10 sixth graders, 14 seventh graders, and 6 eighth graders on the track team. How many ways can the coach choose one sixth grader, one seventh grader, and one eighth grader? Write your answer in the box.

4. Cara randomly chose a date in the month of June then a letter in the word MATHLETE. What is the probability she got a date that is a multiple of 5, followed by a vowel?

A. $\frac{13}{48}$

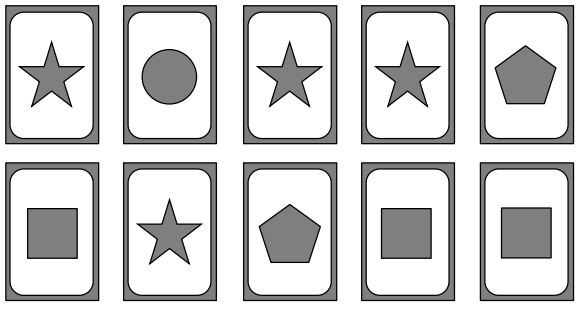
B. $\frac{3}{10}$

C. $\frac{5}{24}$

D. $\frac{3}{40}$

5. Mitchell and Travis are playing on a baseball team. Mitchell has 5 hits out of 12 times at bat and Travis has 9 hits out of 20 times at bat. Based on their past performance, what is the probability that they both get a hit next time at bat? Give your answer as a fraction in simplest form.

6. Kaitlyn draws one of the cards below at random, does not replace it, then draws another. What is the probability that she gets a card with a star on it both times?



A. $\frac{3}{25}$

B. $\frac{2}{15}$

C. $\frac{4}{25}$

D. $\frac{8}{45}$

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7. The data set below represents the number of points scored by a basketball team in their first 12 games last season. Determine which measure is the greatest.

{118, 99, 104, 109, 122, 106, 99, 119, 102, 90, 84, 96}

A. Mean

B. Median

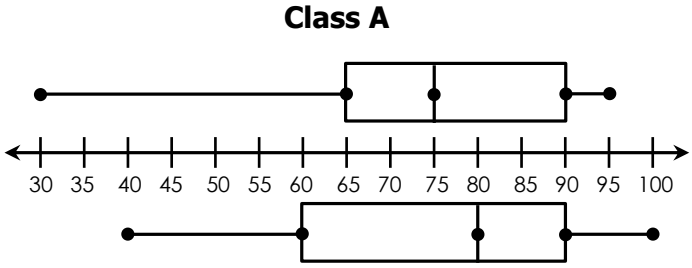
C. Mode

D. Range

8. The data below represents the speed of eight cars on the highway. Find the mean absolute deviation. Write your answer in the box.

{68, 64, 72, 77, 66, 80, 68, 73}

9. The box plot below shows the test scores in two different classes. Determine which statements are true. Check all that apply.



- ☐ Class A had a greater lower quartile.
- ☐ Class B had a lesser median.
- ☐ Class A had a greater interquartile range.
- ☐ Class B had a greater maximum.
- ☐ Class A had a greater range.
- ☐ Both classes had the same upper quartile.

10. If the outside temperature is compared with each variable below, which will most likely have a negative relationship?

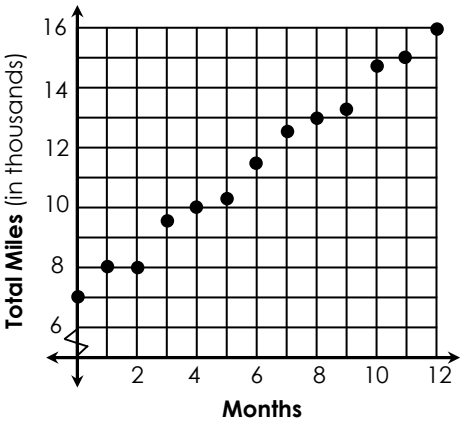
A. number of people at the water park

B. distance to the equator

C. sales on air conditioner units

D. the amount of rainfall

11. Josh bought a used car. The graph below shows the total miles on the car each month after he purchased it. Which line best represents this data?



A. $y = \frac{3}{4}x + 7$

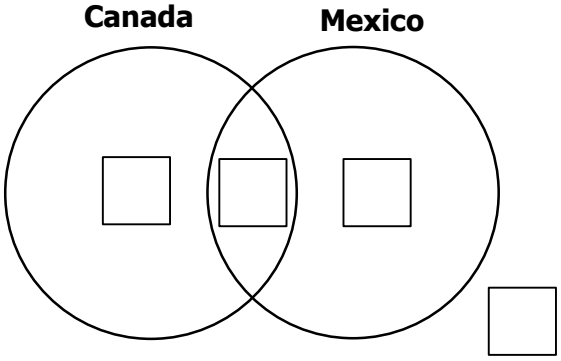
B. $y = \frac{4}{3}x + 7$

C. $y = -\frac{3}{4}x + 7$

D. $y = -\frac{4}{3}x + 7$

12. A partial two-way table below shows the results of a survey in which a group of students were asked if they had been to Canada or Mexico. Using the information from the table, complete the Venn diagram to represent the data from the survey. Write the numbers in the boxes.

		Canada		
		Yes	**No**	**Total**
Mexico	**Yes**	**3**		**18**
	No		**7**	**12**
	Total			



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Name: _____ **Pre-Algebra Review:** Packet #1

Topic #1: Operations with Rational Numbers

1. $-1\frac{2}{3}+4\frac{1}{6}$

$\frac{-5}{3}+\frac{25}{6}$

$=\frac{-10}{6}+\frac{25}{6}=\frac{15}{6}=\boxed{\frac{5}{2}}$ (or $2\frac{1}{2}$)

2. $7\frac{5}{6}-\frac{5}{14}$

$\frac{47}{6}-\frac{5}{14}$

$\frac{329}{42}-\frac{15}{42}=\frac{314}{42}=\boxed{\frac{157}{21}}$ (or $7\frac{10}{21}$)

3. $-3\frac{7}{12}\cdot\frac{-6}{7}$

$\frac{-43}{12}\cdot\frac{-6}{7}$

$=\frac{258}{84}=\frac{43}{14}$ (or $3\frac{1}{14}$)

4. $-4\div\frac{3}{11}$

$\frac{-4}{1}\cdot\frac{11}{3}=\boxed{\frac{-44}{3}}$ (or $-14\frac{2}{3}$)

5. Lee ran a mile in $7\frac{1}{3}$ minutes. His friend Sam ran the same mile in $8\frac{5}{9}$ minutes. How many minutes faster did Lee run?

$8\frac{5}{9}-7\frac{1}{3}$

$\frac{77}{9}-\frac{22}{3}=\frac{77}{9}-\frac{66}{9}=\frac{11}{9}$ or $\boxed{1\frac{2}{9}\text{ minutes}}$

6. Holly has $45\frac{5}{16}$ pounds of fertilizer. If she plans to use $\frac{2}{5}$ of the fertilizer on her front lawn and the rest on her back lawn, how much fertilizer will she use on the back lawn?

$\frac{725}{16}\cdot\frac{2}{5}=\frac{1450}{80}$ or $\boxed{18\ \frac{1}{8}\text{ pounds}}$

7. A large container contains $41\frac{2}{3}$ cups of lemonade. If the lemonade is to be poured into smaller cups, each holding $3\frac{1}{8}$ cups of lemonade, how many cups can be filled?

$41\frac{2}{3}\div3\frac{1}{8}\rightarrow\frac{125}{3}\div\frac{25}{8}\rightarrow\frac{125}{3}\cdot\frac{8}{25}=\frac{1000}{75}$ or $13\frac{1}{3}$

$\boxed{13\text{ cups}}$

Topic #2: Exponents and Scientific Notation

Negative Exponent Rule: $x^{-a}=\frac{1}{x^a}$ **Zero Exponent Rule:** $x^0=1$

8. Rewrite the expressions using only positive exponents. Simplify if possible.

a) $2^{-5}=\frac{1}{2^5}=\boxed{\frac{1}{32}}$

b) $6^{-3}\cdot8^2$

$\frac{1}{6^3}\cdot8^2=\frac{64}{216}=\boxed{\frac{8}{27}}$

c) $3^4\cdot12^{-1}\cdot5^0$

$3^4\cdot\frac{1}{12}=\frac{81}{12}=\boxed{\frac{27}{4}}$

9. Write the following values in scientific notation.

a) 823

$\boxed{8.23\times10^2}$

b) 0.00000000195

$\boxed{1.95\times10^{-9}}$

c) 64,100,000

$\boxed{6.41\times10^7}$

10. Write the following values in standard form.

a) 4.29×10^8

$\boxed{429{,}000{,}000}$

b) 8×10^{-1}

$\boxed{0.8}$

c) 7.5×10^{-4}

$\boxed{0.00075}$

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Topic #3: Square and Cube Roots

List the first 20 perfect square numbers:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400

List the first 12 perfect cube numbers:

1, 8, 27, 64, 125, 216, 343, 512, 729, 1000, 1331, 1728

11. Evaluate each expression.

a) $\sqrt{49}$ 7	b) $-\sqrt{256}$ -16	c) $\sqrt{\frac{4}{25}}$ $\frac{2}{5}$
d) $\sqrt[3]{216}$ 6	e) $\sqrt[3]{1,331}$ 11	f) $\sqrt[3]{-8}$ -2

12. Estimate the following values to the nearest tenth.

a) $\sqrt{78}$ 8.8	b) $\sqrt{262}$ 16.2	c) $-\sqrt{115}$ -10.7

13. Determine the consecutive integers between which each square root lies.

a) $\sqrt{12}$ 3, 4	b) $-\sqrt{158}$ -12, -13	c) $-\sqrt{40}$ -6, -7

Topic #4: The Real Number System

THE REAL NUMBERS: All rational + irrational #s

IRRATIONAL NUMBERS: π, $\sqrt{2}$, $-5\sqrt{12}$ *non-terminating + non-repeating*

RATIONAL NUMBERS: $\frac{4}{3}$, -2.7, 8.1, 3.14 *terminate or repeat*

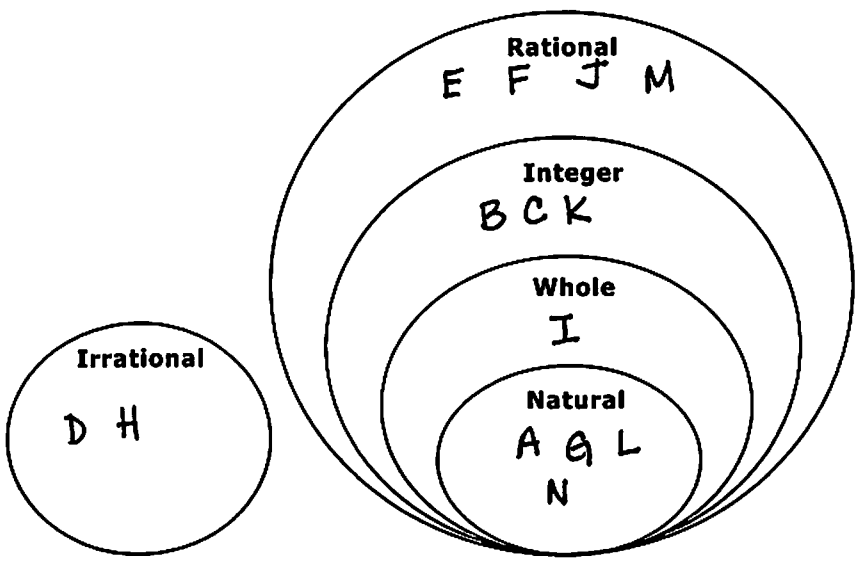
INTEGERS: {..., -2, -1, 0, 1, 2, ...}

WHOLE NUMBERS: {0, 1, 2, 3, ...}

NATURAL NUMBERS: {1, 2, 3, 4, ...}

14. Place the LETTER of the values to the left in the smallest set that contains the value.

A. 7	**B.** $-\frac{45}{9}$
C. $-\sqrt{36}$	**D.** π
E. 6.0487	**F.** $0.\overline{2}$
G. $\sqrt{196}$	**H.** $-\sqrt{90}$
I. 0	**J.** 8^{-1}
K. -19	**L.** $\lvert -24 \rvert$
M. $\sqrt{\frac{1}{16}}$	**N.** 3.7×10^2



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Give an example of each, if possible.

15. A rational number that is not an integer.

$\frac{4}{5}$

16. A natural number that is not a whole number.

Impossible - all natural # are whole #

17. An integer that is an irrational number.

Impossible - all integers are rational.

18. A rational number that is a whole number.

0

Topic #5: Comparing & Ordering Number Forms

Rewrite #19 in order from least to greatest, then #20 in order from greatest to least.

19. $\{\sqrt{225}, 2^6, 1\times10^1, \sqrt[3]{512}, \sqrt{60}, 4^2\}$

15 64 10 8 7.75 16

④ ⑥ ③ ② ① ⑤

$\sqrt{60}, \sqrt[3]{512}, 1\times10^1, \sqrt{225}, 4^2, 2^6$

20. $\left\{4\%, \frac{4}{9}, 4\times10^{-3}, \frac{2}{5}, 4^{-1}, \frac{3}{8}\right\}$

.04 $.\overline{4}$ .004 .4 .25 .375

⑤ ① ⑥ ② ④ ③

$\frac{4}{9}, \frac{2}{5}, \frac{3}{8}, 4^{-1}, 4\%, 4\times10^{-3}$

Topic #6: Order of Operations

Evaluate each expression. Write your answer as a simplified fraction if necessary.

21. $5^2-(3^3-12)\div|-5|$

$25-(27-12)\div5$

$25-15\div5$

$25-3 = \boxed{22}$

22. $\frac{\sqrt{64}-3^3+55}{5+(7-4^2)}$

$\frac{8-27+55}{5+(7-16)}$

$\frac{-19+55}{5+(-9)} = \frac{36}{-4} = \boxed{-9}$

23. $\frac{18+2(4-1)^3}{9^2-21}$

$\frac{18+2(3)^3}{81-21}$

$\frac{18+2(27)}{60} = \frac{18+54}{60} = \frac{72}{60} = \boxed{\frac{6}{5}}$

24. $\frac{7}{6}-\frac{9}{5}\cdot\frac{10}{27}$

$\frac{7}{6}-\frac{90}{135}$

$\frac{7}{6}-\frac{4}{6} = \frac{3}{6} = \boxed{\frac{1}{2}}$

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Topic #7: Evaluating Expressions

Evaluate each expression given the replacement values.

25. $x^3 - 2x^2 + 17$ (if $x = 3$)

$(3)^3 - 2(3)^2 + 17$

$27 - 2(9) + 17$

$27 - 18 + 17$

$9 + 17 = \boxed{26}$

26. $a^2 - b^2$ (if $a = -7$ and $b = 4$)

$(-7)^2 - (4)^2$

$49 - 16 = \boxed{33}$

27. $2m^2 - \sqrt{mn} + n^3$ (if $m = 12$ and $n = 3$)

$2(12)^2 - \sqrt{12 \cdot 3} + (3)^3$

$2(144) - \sqrt{36} + 27$

$288 - 6 + 27$

$282 + 27 = \boxed{309}$

28. $\frac{5}{12}x \div \frac{10}{3}y$ if $x = -4$ and $y = 6$)

$\frac{5}{12}(-4) \div \frac{10}{3}(6)$

$\frac{-20}{12} \cdot \frac{3}{10}(6) = \frac{-60}{120}(6) = -\frac{1}{2}(6) = \boxed{-3}$

Topic #8: Properties

PROPERTY NAME	WHAT IT MEANS	EXAMPLE(S)
COMMUTATIVE	Order does not matter w/ addition + multiplication	$x + 3 = 3 + x$ $-2a \cdot b = b \cdot -2a$
ASSOCIATIVE	grouping doesn't matter w/ addition + multiplication	$-6 \cdot (2 \cdot g) = (-6 \cdot 2)g$ $(5 + x) + y = 5 + (x + y)$
DISTRIBUTIVE	Multiplying a value to an expression in parenthesis.	$\frac{1}{2}(4x - 2y) = 2x - y$ $-b(x + y) = -bx - by$
IDENTITY	Keeps the value of the number.	$a + 0 = a$ $-9x \cdot 1 = -9x$
INVERSE	Uses the opposite to "cancel" out.	$-3/4 + 3/4 = 0$ $\frac{x}{5} \cdot \frac{5}{x} = 1$
ZERO PRODUCT	Anything multiplied by zero is equal to zero.	$-7y \cdot 0 = 0$ $(x + 4y - 6z) \cdot 0 = 0$

Name the property that justifies each statement.

29. $\frac{2}{7} \cdot \frac{7}{2} = 1$ Inverse (Multiplicative)

30. $(-5 + 3) + 8 = -5 + (3 + 8)$ Associative (Addition)

31. $(x + y) + 0 = x + y$ Identity (Additive)

32. $6(2r + s) = 12r + 6s$ Distributive

33. $8 - (2y + 7) = 8 - (7 + 2y)$ Commutative (Addition)

34. $8m + (-8m) = 0$ Inverse (Additive)

35. $(2p^2)q = 2(p^2q)$ Associative (Multiplication)

36. $1 \cdot (a - 3b) = a - 3b$ Identity (Multiplicative)

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Pre-Algebra Review

QUIZ 1

Name: _____

Date: _____ **Per:** _____

1. A rectangle measures $15\frac{1}{4}$ feet by $8\frac{11}{15}$ feet. If the length and width are extended by $1\frac{2}{3}$ feet each, find the area of the new rectangle.

$\frac{61}{4} + \frac{5}{3} = \frac{183}{12} + \frac{20}{12} = \frac{203}{12}$

$\frac{131}{15} + \frac{5}{3} = \frac{131}{15} + \frac{25}{15} = \frac{156}{15}$

$\frac{203}{12} \cdot \frac{156}{15} = \frac{31668}{180} = \frac{2639}{15}$

A. $184\frac{5}{12}$ ft²

C. $172\frac{8}{9}$ ft²

(B.) $175\frac{14}{15}$ ft²

D. $180\frac{3}{4}$ ft²

2. Which expression is equivalent to the expression below?

$$12^{-5} \cdot (-8)^{12} \cdot 7^0$$

(A.) $\frac{(-8)^{12} \cdot 1}{12^5}$

C. $\frac{(-8)^{12} \cdot 0}{12^5}$

B. $\frac{1}{8^{12} \cdot 12^5}$

D. $-(12)^5 \cdot (-8)^{12} \cdot 1$

3. Write an exponent in the box below that would make the statement true.

$$0.000000000000782 = 7.82 \times 10^{\boxed{-13}}$$

4. Which numbers are perfect squares? Check all that apply.

☐ 40	☑ 289
☐ 8	☐ 92
☑ 121	☐ 216

5. Evaluate the expression below. Write your answer in the box.

$\sqrt[3]{729} + \sqrt{64} =$ 17

$9 + 8$

6. Which number lies between the same two consecutive integers as $\sqrt{58}$?

7, 8

A. $\sqrt{42}$ (6, 7)

C. $\sqrt{65}$ (8, 9)

B. $\sqrt{48}$ (6, 7)

(D.) $\sqrt{50}$ (7, 8)

7. Which number is greater than 4^{-2} ?

0.0625

A. 3^{-3} 0.037

C. 6% 0.06

B. 6.3×10^{-3} 0.0063

(D.) $\frac{2}{25}$ 0.08

8. Which list of numbers are correctly ordered from least to greatest?

0.025 0.001 0.11 0.01

A. $\left\{\frac{1}{40}, 1 \times 10^{-3}, 3^{-2}, 1\%\right\}$

B. $\left\{1 \times 10^{-3}, \frac{1}{40}, 1\%, 3^{-2}\right\}$

(C.) $\left\{1 \times 10^{-3}, 1\%, \frac{1}{40}, 3^{-2}\right\}$

D. $\left\{3^{-2}, \frac{1}{40}, 1\%, 1 \times 10^{-3}\right\}$

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9. Which of the following list contains rational numbers only?

A. $\left\{1.7295, \sqrt{200}, \frac{2}{5}, -\sqrt{9}\right\}$

B. $\left\{\sqrt{196}, \frac{40}{8}, -1\frac{4}{13}, -\sqrt{30}\right\}$

C. $\left\{-\frac{12}{5}, \sqrt[3]{64}, \sqrt{10}, 16\%\right\}$

(D.) $\left\{-\sqrt{144}, 0.\overline{92}, \frac{17}{11}, \sqrt{\frac{4}{49}}\right\}$

10. Which value is not an integer?

(A.) 20% .2

B. $-\sqrt{81}$ -9

C. $\frac{42}{6}$ 7

D. $.08\times10^2$ 8

11. Which statement is true?

A. An integer is never a whole number.

(B.) A rational number is always a real number.

C. No number is both an integer and a natural number.

D. No number is both an irrational number and a real number.

12. Simplify the expression below. Write your answer in the box.

$$\frac{-|-14|+2^6}{26-(3+5^2)}$$

$\frac{-14+64}{26-(3+25)} = \frac{50}{26-28} = \frac{50}{-2}$

-25

13. Evaluate the expression below if $x = \frac{15}{8}$ and $y = -3$.

$$\frac{3}{8}y^2 - \frac{4}{3}x$$

A. $-\frac{47}{8}$

(B.) $\frac{7}{8}$

C. $\frac{5}{12}$

D. $\frac{21}{16}$

$\frac{3}{8}(-3)^2 - \frac{4}{3}\left(\frac{15}{8}\right)$

$\frac{3}{8}(9) - \frac{60}{24}$

$\frac{27}{8} - \frac{20}{8}$

14. Which expression could be placed in the box to show an example of the commutative property?

$$\frac{1}{2}(m+n) - p = \boxed{?}$$

A. $\frac{1}{2}m(n-p)$

(B.) $(m+n)\frac{1}{2} - p$

C. $p - \frac{1}{2}(m+n)$

D. $\frac{1}{2}m + \frac{1}{2}n - \frac{1}{2}p$

15. Write a value in each box to illustrate the inverse property of addition.

$$\frac{3}{7} + \boxed{-\frac{7}{3}} = \boxed{0}$$

16. Which statement can not be justified by the properties of real numbers?

(A.) $(x+y)^2 = x^2 + y^2$

B. $(x-y)^2 z = z(x-y)^2$ (Commutative)

C. $z(x^2+y^2) = x^2z + y^2z$ (distributive)

D. $(x-y)\cdot\frac{1}{x-y} = 1$ (inverse)

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Name: _____ **Pre-Algebra Review:** Packet #2

Topic #1: Translating Expressions

Translate each expression.	
1. "One less than the product of four and a number." $4n-1$	**2.** "Two-thirds of a number increased by seven." $\frac{2}{3}n+7$
3. "The difference between m and n." $m-n$	**4.** "Nine subtracted from a number squared." n^2-9
5. "The quotient of twice a number and five." $\frac{2n}{5}$	**6.** "The sum of one-fourth of a number and 27." $\frac{1}{4}n+27$

Topic #2: Simplifying & Factoring Expressions

Simplify each expression by distributing and/or combining like terms.		
7. $2(x+9)$ $2x+18$	**8.** $-3(4c-1)$ $-12c+3$	**9.** $-(5p+17)$ $-5p-17$
10. $7a-8-6-2a$ $5a-14$	**11.** $-5-14k-8+19k-k$ $4k-13$	**12.** $-3m+n-2n-6m+17m$ $8m-n$
13. $-7(2c+3)+5(c-1)$ $-14c-21+5c-5$ $\boxed{-9c-26}$	**14.** $2-2(7w-4)+10w$ $2-14w+8+10w$ $\boxed{-4w+10}$	**15.** $\frac{2}{3}(6x-27)-(x+8)$ $4x-18-x-8$ $\boxed{3x-26}$

Factor each expression. If it cannot be factored, write "prime."			
16. $3x+9$ $3(x+3)$	**17.** $8y-28$ $4(2y-7)$	**18.** $15m-8$ Prime	**19.** $32a-12b$ $4(8a-3b)$

Topic #3: Solving Equations

Solve each equation. Give your answer as a simplified fraction if necessary.		
20. $8x-19=-91$ $+19 \quad +19$ $\frac{8x}{8}=\frac{-72}{8}$ $\boxed{x=-9}$	**21.** $-7=-1+\frac{a}{-2.5}$ $+1 \quad +1$ $-2.5\cdot-6=\frac{a}{-2.5}\cdot-2.5$ $\boxed{15=a}$	**22.** $\frac{n-4}{2}=-13\cdot2$ $n-4=-26$ $+4 \quad +4$ $\boxed{n=-22}$

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23. $\frac{6}{5}v - 11 = -35$

$+11 \quad +11$

$\frac{5}{6} \cdot \frac{6}{5}v = -24 \cdot \frac{5}{6}$

$v = -20$

24. $-2x - 7 - 1 - 3x = 37$

$-5x - 8 = 37$

$+8 \quad +8$

$\frac{-5x}{-5} = \frac{45}{-5}$

$x = -9$

25. $13 - 2(6k - 8) = -27$

$13 - 12k + 16 = -27$

$-12k + 29 = -27$

$-29 \quad -29$

$-12k = -56$

$k = \frac{14}{3}$

26. $8a + 17 = 5a + 5$

$-5a \quad -5a$

$3a + 17 = 5$

$-17 \quad -17$

$\frac{3a}{3} = \frac{-12}{3}$

$a = -4$

27. $\frac{1}{2}(10p + 18) = -3(p + 7)$

$5p + 9 = -3p - 21$

$+3p \quad +3p$

$8p + 9 = -21$

$-9 \quad -9$

$8p = -30$

$p = \frac{-15}{4}$

28. $w - (3w - 1) = 3(4w + 5)$

$w - 3w + 1 = 12w + 15$

$-2w + 1 = 12w + 15$

$+2w \quad +2w$

$1 = 14w + 15$

$-15 \quad -15$

$\frac{-14}{14} = \frac{14w}{14}$

$w = -1$

Translate and solve each equation.

29. "Ten subtracted from the product of a number and -3 is 29."

$-3n - 10 = 29$

$+10 \quad +10$

$\frac{-3n}{-3} = \frac{39}{-3}$

$n = -13$

30. "The difference between a number and nine, divided by 4, is -7."

$4 \cdot \frac{n - 9}{4} = -7 \cdot 4$

$n - 9 = -28$

$+9 \quad +9$

$n = -19$

Topic #4: Special Solutions

Solve each equation and identify the solution.

31. $2(6x + 5) = 3(4x + 3)$

$12x + 10 = 12x + 9$

$-12x \quad -12x$

$10 \neq 9$

No Solution

32. $10 - (2n + 3) = -\frac{1}{2}(4n - 14)$

$10 - 2n - 3 = -2n + 7$

$-2n + 7 = -2n + 7$

$+2n \quad +2n$

$7 = 7$

All real #s

33. $-3(6 - r) = 5r - 2(r + 9)$

$-18 + 3r = 5r - 2r - 18$

$-18 + 3r = 3r - 18$

$-3r \quad -3r$

$-18 = -18$

All real #s

34. $10 - (4 - 8h) = 2(4h - 3)$

$10 - 4 + 8h = 8h - 6$

$6 + 8h = 8h - 6$

$-8h \quad -8h$

$6 \neq -6$

No Solution

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Topic #5: Equation Word Problems

Write and solve an equation to solve each problem.

35. Maggie opened a big bag of jelly beans and ate one-fifth of them. The next day, she ate 40 more jelly beans from the bag. If she ate 107 jelly beans between the two days, find the original number of jelly beans in the bag.

let x = jelly beans in original bag

$\frac{1}{5}x + 40 = 107$

$-40 \quad -40$

$5 \cdot \frac{1}{5}x = 67 \cdot 5$

$x = 335$ jelly beans

36. Josh used one hundred dollars less three-fourths of his paycheck to buy a new TV. If the cost of the new TV was $488, how much was his paycheck?

let x = paycheck amount

$\frac{3}{4}x - 100 = 488$

$+100 \quad +100$

$\frac{4}{3} \cdot \frac{3}{4}x = 588 \cdot \frac{4}{3}$

$x = \$784$

37. The sum of two numbers is 86. The larger number is nine less than four times the smaller number. Find both numbers.

let x = smaller #

let 4x-9 = larger #

$x + 4x - 9 = 86$

$5x - 9 = 86$

$+9 \quad +9$

$\frac{5x}{5} = \frac{95}{5}$

$x = 19$

19 + 67

38. Nate and Gavin are playing a video game. Gavin has scored eleven more than twice the number of points than Nate has. If they scored 692 points altogether, have many point has Gavin scored?

let x = Nate's pts

let 2x+11 = Gavin's pts

$x + 2x + 11 = 692$

$3x + 11 = 692$

$-11 \quad -11$

$\frac{3x}{3} = \frac{681}{3}$

$x = 227$

$2(227) + 11 =$

465 pts

Topic #6: Solving & Graphing Inequalities

Identify each inequality symbol.

LESS THAN	LESS THAN OR EQUAL TO	GREATER THAN	GREATER THAN OR EQUAL TO
$<$	$\leq$	$>$	$\geq$

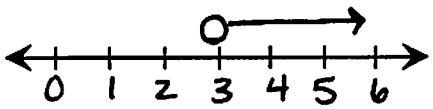
Solve and graph each inequality.

39. $5x - 9 > 6$

$+9 \quad +9$

$\frac{5x}{5} > \frac{15}{5}$

$x > 3$

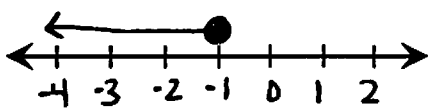


40. $\frac{k-7}{-4} \geq 2$ (·-4)

$k - 7 \leq -8$

$+7 \quad +7$

$k \leq 1$



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41. $15v + 32 < 11v - 24$

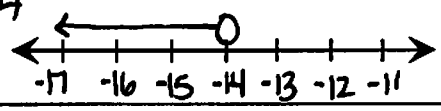
$-11v \quad -11v$

$4v + 32 < -24$

$-32 \quad -32$

$\frac{4v}{4} < \frac{-56}{4}$

$v < -14$



42. $9(a+1) \leq 3(4a-5)$

$9a + 9 \leq 12a - 15$

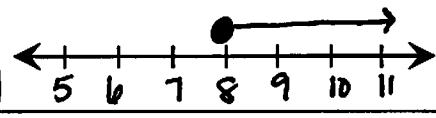
$-9a \quad -9a$

$9 \leq 3a - 15$

$+15 \quad +15$

$\frac{24}{3} \leq \frac{3a}{3}$

$8 \leq a \rightarrow a \geq 8$



Solve each inequality and check the possible solutions.

43. $14 - 9x \geq 50$

$-14 \quad -14$

$-9x \geq 36$

$\frac{-9x}{-9} \geq \frac{36}{-9}$

$x \leq -4$

- ☑ -7
- ☑ -6
- ☑ -5
- ☑ -4
- ☐ -3

44. $\frac{3}{4}(8n - 20) > 39$

$6n - 15 > 39$

$+15 \quad +15$

$\frac{6n}{6} > \frac{54}{6}$

$n > 9$

- ☐ 7
- ☐ 8
- ☐ 9
- ☑ 10
- ☑ 11

Translate and solve each inequality.

45. "Eleven more than three times a number is at most 62."

$3n + 11 \leq 62$

$-11 \quad -11$

$\frac{3n}{3} \leq \frac{51}{3}$

$n \geq 17$

46. "Twice a number subtracted from sixty is no less than twenty-eight."

$60 - 2n \geq 28$

$-60 \quad -60$

$\frac{-2n}{-2} \geq \frac{-32}{-2}$

$n \leq 16$

Topic #7: Inequality Word Problems

Write and solve an inequality to solve each problem.

47. Ann is stocking on up boxes of cereal. If they are on sale for $2.25 each and she has a $2 coupon, and she wishes to spend a maximum of $20 on cereal, how many boxes can she buy?

let x = boxes of cereal

$2.25x - 2 \leq 20$

$+2 \quad +2$

$\frac{2.25x}{2.25} \leq \frac{22}{2.25}$

$x \leq 9.\overline{7}$

9 boxes of cereal

48. Scott is selling coupon books to raise money for his football team. If he has raised $60 so far and the coupon books cost $15 each, how many more must be sell in order to raise at least $300?

let x = coupon books

$15x + 60 \geq 300$

$-60 \quad -60$

$\frac{15x}{15} \geq \frac{240}{15}$

$x \geq 16$

16 more coupon books

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Pre-Algebra Review

QUIZ 2

Name: _____

Date: _____ **Per:** _____

1. Which expression does not simplify to $-8x + 27$?

A. $-7(2x-5)+6x-8$

B. $3x-17-11x+44$

C. $21-\frac{2}{3}(15x-9)+2x$

(D.) $33-(7-8x)+1$ $8x+27$

2. Choose one term from Column 1 and one term from Column 2 to create a prime expression. Write your answers in the box.

9x	+	28

Column 1	Column 2
$8x$	42
$9x$	30
$6x$	28

3. Which expression represents the factored from of the simplified expression below?

$$-36-3m+15m-4$$

$12m-40$

A. $2(9m-16)$

B. $2(9m-20)$

(C.) $4(3m-10)$

D. $4(3m-8)$

4. Solve the equation below. Write your answer in the box.

$$\frac{2}{3}a-1=-11$$
$$+1 \quad +1$$
$$\frac{3}{2}\cdot\frac{2}{3}a=-10\cdot\frac{3}{2}$$
$$a=\frac{-30}{2}$$

$a=-15$

5. Find the value of k.

$$7k-12=13k-42$$
$$-12=6k-42$$
$$30=6k$$
$$k=5$$

A. $k = -5$

(B.) $k = 5$

C. $k = -9$

D. $k = 9$

6. Find the value of w.

$$3-(5w+14)=-\frac{3}{4}(12w+4)$$
$$3-5w-14=-9w-3$$
$$-5w-11=-9w-3$$
$$4w-11=-3$$
$$4w=8$$
$$w=2$$

A. $w = -2$

(B.) $w = 2$

C. $w = -7$

D. $w = 7$

7. Which equation has an infinite solution?

(A.) $2(x+10)=4(5-x)+6x$ $2x+20=2x+20$

B. $3(4x-3)=6(2x-3)$

C. $-18-(3x-2)=3(x-5)-1$

D. $-2(3x+5)=2(3x-5)$

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8. At the beginning of a musical, four-fifths of the seats in the theater were filled. During intermission, 18 people left. If there were 286 people left, how many seats are in the theater?

$\frac{4}{5}x - 18 = 286$
$+18 \quad +18$

$\frac{5}{4} \cdot \frac{4}{5}x = 304 \cdot \frac{5}{4}$

$x = 380$

A. 335
B. 350
(C.) 380
D. 400

9. Which equation results in a solution of 8?

A. Eighteen less than twice a number is two.

B. Fifteen subtracted from the quotient of a number and four is seventeen.

(C.) The sum of a number and seven, divided by five, is three. $\frac{x+7}{5} = 3 \rightarrow x+7 = 15$, $x = 8$

D. The difference between one and the product of a number and three is twenty.

10. In one minute, Evan can do nine less than four times the number of push-ups that Lucy can do. If they did 61 push-ups in all, how many more push-ups did Evan do than Lucy?

x = Lucy
$4x-9$ = Evan

$4x - 9 + x = 61$
$5x - 9 = 61$
$5x = 70$
$x = 14$

E: 47
L: 14
} $47 - 14 = 33$

A. 26
B. 28
C. 31
(D.) 33

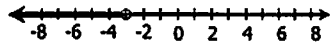
11. To get an A in Science, Sally must get at least a 96 on her next test. Which inequality shows the grade, g, Sally needs?

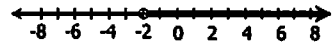
(A.) $g \geq 96$
B. $g \leq 96$
C. $g > 96$
D. $g < 96$

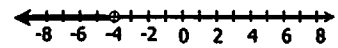
11. Which graph shows the solutions to the inequality below?

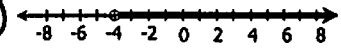
$-5(2x+1) < 35$

$-10x - 5 < 35$
$-10x < 40$
$x > -4$

A. 

B. 

C. 

(D.) 

12. Find the solution to the inequality below:

$\frac{2}{3}(12x-9) \leq 5x - 48$

$8x - 6 \leq 5x - 48$
$3x - 6 \leq -48$
$3x \leq -42$
$x \leq -14$

A. $x \geq -14$
(B.) $x \leq -14$
C. $x \geq -18$
D. $x \leq -18$

14. Which values are solutions to the inequality below? Check all that apply.

$-7x + 30 > -15 - 2x$
$-5x + 30 > -15$
$-5x > -45$
$x < 9$

☑ 5	☐ 9	☑ $\frac{60}{7}$
☑ $\sqrt[3]{64}$	☐ $\lvert -11 \rvert$	☐ $\sqrt{94}$

15. Taylor stopped as the gas station to get gas and a car wash. The car wash costs \$5 and gas costs \$2.50 per gallon. If she can spend at most \$35, how many gallons of gas, x, can she afford?

$2.50g + 5 \leq 35$
$2.50g \leq 30$
$g \leq$

A. $x \geq 12$
(B.) $x \leq 12$
C. $x \geq 16$
D. $x \leq 16$

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Name: _____ **Pre-Algebra Review:** Packet #3

Topic #1: Exponent Rules

Product Rule	**Quotient Rule**	**Power Rule**
$x^a \cdot x^b = x^{a+b}$	$\frac{x^a}{x^b} = x^{a-b}$	$(x^a)^b = x^{ab}$

Simplify each expression. Your final answer should contain only positive exponents.

1. $x^2 \cdot x^8$ x^{10}	**2.** $-2m^8 \cdot 7m$ $-14m^9$	**3.** $6a^3b^2 \cdot 2a^4b^3$ $12a^7b^5$
4. $k^{-1} \cdot k^{-4}$ $k^{-5} = \frac{1}{k^5}$	**5.** $8a^2 \cdot 2a^{-7}$ $16a^{-5} = \frac{16}{a^5}$	**6.** $4p^{-5}q^{-2} \cdot -7p^9q$ $-28p^4q^{-1} = \frac{-28p^4}{q}$
7. $\frac{n^{20}}{n^5}$ n^{15}	**8.** $\frac{32m^9}{8m^3}$ $4m^6$	**9.** $\frac{-4a^6b^4}{6ab^4}$ $-\frac{2}{3}a^5b^0 = \frac{-2a^5}{3}$
10. $\frac{y^4}{y^7}$ $y^{-3} = \frac{1}{y^3}$	**11.** $\frac{4v^8}{12v^{-2}}$ $\frac{1}{3}v^{10} = \frac{v^{10}}{3}$	**12.** $\frac{c^{-9}d^3}{c^{-2}d^{11}}$ $c^{-7}d^{-8} = \frac{1}{c^7d^8}$
13. $(x^4)^6$ x^{24}	**14.** $(3m^2n^5)^3$ $27m^6n^{15}$	**15.** $(-7a^9b^3c)^2$ $49a^{18}b^6c^2$
16. $(w^{-2})^9$ $w^{-18} = \frac{1}{w^{18}}$	**17.** $(2a^{-5})^{-4}$ $\frac{1}{16}a^{20} = \frac{a^{20}}{16}$	**18.** $(5m^{-1}n^7)^3$ $125m^{-3}n^{21} = \frac{125n^{21}}{m^3}$

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Topic #2: Multiplying & Dividing Numbers Written in Scientific Notation

Multiplication	Division
$(x\times10^{a})\cdot(y\times10^{b}) =$ $xy \times 10^{a+b}$	$\frac{(x\times10^{a})}{(y\times10^{b})} =$ $\frac{x}{y} \times 10^{a-b}$
Simplify each expression. Final answers must be written properly in scientific notation.	
19. $(2\times10^{7})\cdot(3\times10^{4})$ 6×10^{11}	**20.** $(8\times10^{-2})\cdot(9\times10^{8})$ $72 \times 10^{6} = 7.2 \times 10^{7}$
21. $(6.5\times10^{-7})\cdot(3.2\times10^{-3})$ 20.8×10^{-10} $= 2.08 \times 10^{-9}$	**22.** $(1.8\times10^{1})\cdot(7.2\times10^{-5})$ 12.96×10^{-4} $= 1.296 \times 10^{-3}$
23. $(8\times10^{12})\div(4\times10^{4})$ 2×10^{8}	**24.** $(3\times10^{-2})\div(4\times10^{-4})$ $.75 \times 10^{2}$ $= 7.5 \times 10^{1}$
25. $\frac{2.4\times10^{7}}{6\times10^{16}}$ 0.4×10^{-9} $= 4 \times 10^{-10}$	**26.** $\frac{3.6\times10^{-5}}{9.6\times10^{-13}}$ 0.375×10^{8} $= 3.75 \times 10^{7}$

Topic #3: Adding & Subtracting Numbers Written in Scientific Notation

For adding or subtracting numbers written in scientific notation: Adjust the exponents so they are the same, then add/subtract the numbers and keep the common exponent!
Simplify each expression. Final answers must be written properly in scientific notation.
27. $(6\times10^{-4})+(1.2\times10^{-4})$ 7.2×10^{-4}
28. $(3.25\times10^{15})-(3.07\times10^{15})$ 0.18×10^{15} $= 1.8 \times 10^{14}$

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29. $(8.1\times10^{6})+(2.5\times10^{5})$

$(8.1 \times 10^6) + (.25 \times 10^6)$

$= \boxed{8.35 \times 10^6}$

30. $(5.1\times10^{-2})-(2.3\times10^{-1})$

$(.51 \times 10^{-1}) - (2.3 \times 10^{-1})$

$= \boxed{-1.79 \times 10^{-1}}$

31. $(1.2\times10^{9})-(9.5\times10^{8})$

$(1.2 \times 10^9) - (.95 \times 10^9)$

$= .25 \times 10^9$

$= \boxed{2.5 \times 10^8}$

32. $(9.2\times10^{11})+(4.98\times10^{13})$

$(0.092 \times 10^{13}) + (4.98 \times 10^{13})$

$= \boxed{5.072 \times 10^{13}}$

Topic #4: Applications with Scientific Notation

Simplify each expression. Final answers must be written properly in scientific notation.

33. If the United States is approximately 3.8×10^{6} square miles and France is approximately 2.1×10^{5} square miles, approximately how many more square miles is the United States than France?

$(3.8 \times 10^6) - (2.1 \times 10^5)$

$= (3.8 \times 10^6) - (.21 \times 10^6)$ $= \boxed{3.59 \times 10^6}$

34. The total revenue of a certain company was 2.4×10^{7} dollars in 2015. In 2016, the total revenue was 75% of the total revenue in 2015. Find the total revenue in 2016.

$(2.4 \times 10^7) \cdot (7.5 \times 10^{-1})$

$= 18 \times 10^6$

$= \boxed{1.8 \times 10^7}$

35. The population of a city is currently 3.5×10^{6}. This is approximately 40 times more than it was one hundred years ago. Find the population of the city one hundred years ago.

$(3.5 \times 10^6) \div (4.0 \times 10^1)$

$= 0.875 \times 10^5$

$= \boxed{8.75 \times 10^4}$

36. Jayden bought a new computer with 2.56×10^{11} bytes of hard drive space. He also signed up for a Dropbox account that offers 2×10^{9} bytes of space. How much storage space does he have total with between his computer and Dropbox?

$(2.56 \times 10^{11}) + (2 \times 10^9)$

$= (2.56 \times 10^{11}) + (.02 \times 10^{11})$ $= \boxed{2.58 \times 10^{11}}$

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Pre-Algebra Review

QUIZ 3

Name: _____

Date: _____ **Per:** _____

1. Simplify the expression below.

$$7p^2 \cdot 4p^6$$

(A.) $28p^8$ C. $28p^{12}$

B. $11p^8$ D. $11p^{12}$

2. Simplify the expression below.

$$\frac{-20w^{12}}{4w^3}$$

A. $-16w^4$ C. $\frac{w^9}{5}$

B. $-5w^4$ (D.) $-5w^9$

3. Which expression simplifies to $16a^{12}b^4$?

A. $-8a^2b \cdot -2a^6b^4$

B. $\frac{32a^{24}b^8}{2a^2b^2}$

(C.) $(-4a^6b^2)^2$

D. $(4a^3b)^4$

4. Write the values in the boxes that make the statement true.

$$\frac{5}{3}xz^{\boxed{8}} \cdot \boxed{9}x^{\boxed{6}}y^{\boxed{0}}z^2 = 15x^7z^{10}$$

5. Simplify the expression below.

$$(3k^{-2})^3$$

A. $27k$

(B.) $\frac{27}{k^6}$

C. $\frac{9}{k^6}$

D. $9k$

6. Simplify the expression below.

$$\frac{c^{-8}d^5}{c^{-6}d^5}$$

$c^{-2}d^0$

A. $\frac{1}{c^{14}}$

(B.) $\frac{1}{c^2}$

C. $\frac{d}{c^2}$

D. $\frac{d}{c^{14}}$

7. Write a value in the box that makes the statement true.

$$w^{\boxed{-6}} \cdot w^{-2} = \frac{1}{w^8}$$

8. Which expressions are equivalent to $\frac{18a^{14}}{b^4}$? Check all that apply.

☑ $\frac{54a^{16}b^{-1}}{3a^2b^3}$	☐ $18(a^{10}b^{-1})^4$
☐ $(9a^7b^{-2})^2$	☑ $24a^2b^{-2} \cdot \frac{3}{4}a^{12}b^{-2}$
☐ $3a^7b \cdot 6a^2b^{-4}$	☐ $\frac{20a^{19}b^{-5}}{-2a^{-1}b^1}$

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9. Find the product of 9×10^{12} and 4×10^{4}.

36×10^{16}

A. 3.6×10^{15}

(B.) 3.6×10^{17}

C. 3.6×10^{46}

D. 3.6×10^{48}

10. Evaluate the expression below.

$$(7.5 \times 10^{9}) + (4.3 \times 10^{9})$$

11.8×10^{9}

(A.) 1.18×10^{10}

B. 1.18×10^{8}

C. 1.18×10^{19}

D. 1.18×10^{17}

11. Evaluate the expression below.

$$(1.1 \times 10^{-6}) - (2.9 \times 10^{-7})$$

$(1.1 \times 10^{-6}) - (.29 \times 10^{-6})$

$.81 \times 10^{-6}$

A. -1.8×10^{-13}

B. 1.8×10^{1}

C. 8.1×10^{-6}

(D.) 8.1×10^{-7}

12. Evaluate the expression below.

$$\frac{6.3 \times 10^{15}}{(7.15 \times 10^{5}) + (5 \times 10^{3})}$$

$.05 \times 10^{5}$

A. 8.75×10^{7}

B. 8.75×10^{-1}

(C.) 8.75×10^{9}

D. 8.75×10^{2}

$= \frac{6.3 \times 10^{15}}{7.2 \times 10^{5}}$

$= .875 \times 10^{10}$

13. A factory manufactures 9×10^{5} packs of gum each month. They send these out to 16 different distribution centers. If each distribution center gets the same number of packs, how many are sent to each center?

$$\frac{9 \times 10^{5}}{1.6 \times 10^{1}}$$

(A.) 5.625×10^{4}

B. 5.625×10^{6}

C. 1.44×10^{4}

D. 1.44×10^{6}

14. The population of five cities in Pennsylvania is shown in the table below. How many total people live in the two most populated cities? Give your answer in scientific notation.

Allentown	1.2×10^{5}
Philadelphia	1.6×10^{6} *
Erie	9.9×10^{4}
Pittsburgh	3.1×10^{5} *
Scranton	7.5×10^{4}

$(1.6 \times 10^{6}) + (3.1 \times 10^{6})$ 1.91×10^{6}

15. Earth's mass is approximately 6×10^{24} kilograms. Find the mass of Neptune if it is 17 times greater than the mass of Earth.

$(6 \times 10^{24}) \cdot (1.7 \times 10^{1})$

$= 10.2 \times 10^{25}$

A. 1.1×10^{27}

B. 1.1×10^{25}

C. 1.02×10^{22}

(D.) 1.02×10^{26}

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Name: _____ **Pre-Algebra Review:** Packet #4

Topic #1: Ratios & Rates

Use for questions 1 and 2: There are 30 freshmen, 37 sophomores, 25 juniors, and 48 seniors in the marching band. Find each ratio and give your answer in simplest form.

1. What is the ratio of freshman to seniors? Write your answer in simplest form.

$\frac{30}{48} = \boxed{\frac{5}{8}}$

2. What is the ratio of juniors to the total number of students in the band? Write your answer in simplest form.

$\frac{25}{140} = \boxed{\frac{5}{28}}$

3. Tessa burned 357 calories in 42 minutes on the elliptical. Ashley only spent 30 minutes on the elliptical and burned 267 calories. Who burned calories at a faster rate?

T: 8.5 cal/min
A: 8.9 cal/min

Tessa

4. Mr. Rickman filled his tank with 16 gallons of gas for $35.04. Later that day, his wife filled her tank with 18 gallons of gas for $39.96 at a different gas station. Who got the better deal?

Mr: $2.19/gal
Mrs: $2.22/gal

Mr. Rickman

Topic #2: Proportional Relationships

Solve the following proportions.

5. $\frac{5}{3} = \frac{x}{57}$

$\frac{3x}{3} = \frac{285}{3}$

$\boxed{x = 95}$

6. $\frac{14}{x} = \frac{4}{7}$

$\frac{4x}{4} = \frac{98}{4}$

$\boxed{x = 24.5}$

7. $\frac{1.8}{x} = \frac{9}{3.5}$

$\frac{9x}{9} = \frac{6.3}{9}$

$\boxed{x = 0.7}$

8. If it took Max 54 minutes to drive a 60-mile stretch of highway, how long would it take him to drive a 75-mile stretch if he maintains a constant speed?

$\frac{54}{60} = \frac{x}{75}$ $\quad \frac{60x}{60} = \frac{4050}{60}$

$x = \boxed{67.5 \text{ min}}$

9. The recreation center is hiring counselors for summer camp. They need four counselors for every 25 campers. If there are 140 campers, how many counselors will they need?

$\frac{4}{25} = \frac{x}{140}$ $\quad \frac{25x}{25} = \frac{560}{25}$

$x = 22.4$

23 counselors

10. Colton was in hot dog eating contest. If it took him 90 seconds to eat seven hot dogs, how many full hot dogs did he eat in ten minutes?

$\frac{7}{1.5} = \frac{x}{10}$ $\quad 1.5x = 70$

$x = 46.\overline{6}$

46 hot dogs

11. Ryan and Jess went for an 8-mile run. It took Ryan 25 minutes to reach the 3-mile point. If Jess reached this point 7 minutes after Ryan did, how long did it take her to complete the 8 miles if she maintained a constant speed?

$\frac{32}{3} = \frac{x}{8}$ $\quad 3x = 256$

$x = 85.\overline{3}$

85 min, 20 sec

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12. The distance between two cities on a map is $3\frac{7}{8}$ inches. If the map uses a scale of $\frac{1}{2}$ inch = 25 miles, find the actual distance between the cities.

$\frac{.5}{25} = \frac{3.875}{x}$ $\quad \frac{.5x}{.5} = \frac{96.875}{.5}$

$x = 193.75$ mi

13. A model of the White House uses a scale of 2 inches = 15 feet. If the actual White House is 70 feet tall, how tall is the model?

$\frac{2}{15} = \frac{x}{70}$ $\quad \frac{15x}{15} = \frac{140}{15}$

$x = 9.\overline{3}$

$9\frac{1}{3}$ in

14. Bill is replacing his 15 feet long by 12 feet wide deck. The new deck will add five feet to the length and four feet to the width. If a drawing of the new deck uses a scale of 1 inch = 2.5 feet, find the dimensions of the deck on the drawing.

$\frac{1}{2.5} = \frac{x}{20}$ $\quad \frac{2.5x}{2.5} = \frac{20}{2.5}$

$x = 8$

$\frac{1}{2.5} = \frac{x}{16}$ $\quad \frac{2.5x}{2.5} = \frac{16}{2.5}$

$x = 6.4$

8 in long x 6.4 in wide

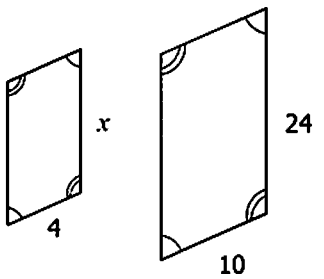
15. If a model 184-foot long NASA Space Shuttle is 8 inches long, what scale was used to create the model?

$\frac{184}{8} = 23$

23 ft = 1 in

Topic #3: Similar Figures & Indirect Measure

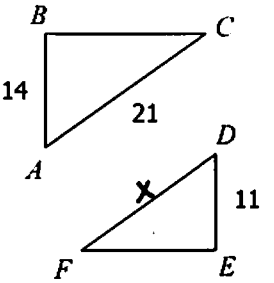
16. If the figures are similar, find x.



$\frac{4}{10} = \frac{x}{24}$ $\quad \frac{10x}{10} = \frac{96}{10}$

$x = 9.6$

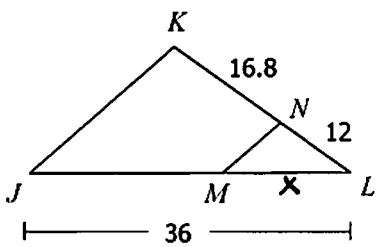
17. If $\Delta ABC \sim \Delta DEF$, find FD.



$\frac{14}{11} = \frac{21}{x}$ $\quad \frac{14x}{14} = \frac{231}{14}$

$x = 16.5$

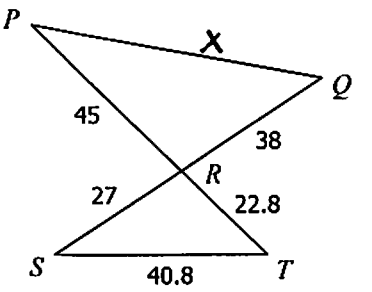
18. If $\Delta JKL \sim \Delta MNL$, find ML.



$\frac{12}{x} = \frac{28.8}{36}$ $\quad \frac{28.8x}{28.8} = \frac{432}{28.8}$

$x = 15$

19. If $\Delta PQR \sim \Delta STR$, find PQ.



$\frac{27}{45} = \frac{40.8}{x}$ $\quad \frac{27x}{27} = \frac{1836}{27}$

$x = 68$

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20. A 28-foot tall tree casts a shadow 15 feet long at the same time that a building casts shadow 72 feet long. How tall is the building?

$\frac{28}{15} = \frac{x}{72}$ $\quad \frac{15x}{15} = \frac{2016}{15}$

$x = 134.4$ ft

21. The Gateway Arch in St. Louis, Missouri is 630 feet tall. If a 6-foot tall person standing near the Arch casts a shadow 2.5 feet long, find the length of the shadow casted by the Arch.

$\frac{6}{2.5} = \frac{630}{x}$ $\quad \frac{6x}{6} = \frac{1575}{6}$

$x = 262.5$ ft

Topic #4: Percents

22. In a school survey, 62.5% of the students surveyed said they were in favor of new school uniforms. If 720 students were surveyed, how many are in favor of new uniforms?

$\frac{62.5}{100} = \frac{x}{720}$ $\quad \frac{100x}{100} = \frac{45000}{100}$

$x = 450$ students

23. Ciara put 5.28 gallons of gas in her car. If this only fills up 20% of her tank, how many more gallons can she put in?

$\frac{20}{100} = \frac{5.28}{x}$ $\quad \frac{20x}{20} = \frac{528}{20}$

$x = 26.4$

$26.4 - 5.28 =$ 21.12 more gallons

24. A new Apple Watch costs $369. If the watch is on sale for 15% off, what is the sale price?

$369(0.85) =$ \$313.65

25. Hotels on the beach generally markup room rates on holiday weekends. If a hotel room that is regularly priced at $149 per night is marked up 30%, find the cost after the markup.

$149(0.30) = 44.70$

$149 + 44.70 =$ \$193.70

26. Ari is buying a new bicycle for $290. If sales tax is 6.4%, how much will be added to the price of the bicycle?

$290(0.064) =$ \$18.56

27. Blake is buying an open-box laptop that has been discounted 25%. If the laptop was originally $1,199 and sales tax is 8.25%, how much will he pay in total?

$1199(0.75) = 899.25$

$899.25(0.0825) = 74.19$

$899.25 + 74.19 =$ \$973.44

28. The Smith family went out to dinner. Their bill came to $67.80. If they used a $100 gift card and left a 15% tip, what is the remaining balance on the card?

$67.80(0.15) = 10.17$ (tip)

$67.80 + 10.17 = 77.97$ (total)

$100 - 77.97 =$ \$22.03 left on the gift card

29. The table below shows the sale prices at a certain store. Kate picked out a shirt that regularly costs $20 and a hat that regularly costs $24. If she can spend no more than $75, can she also afford a pair of jeans that regularly cost $58?

Item	Discount
Shirts	25%
Jeans	30%
Hats	15%
Backpacks	20%

$20(.75) = 15$

$58(.70) = 40.6$

$24(.86) = 20.40$

\$76

No, she cannot afford them.

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30. Justin bought a boat for $35,000 in 2014. In 2016, it was worth $21,000. Find the percent of change from 2014 to 2016.

$\frac{21000-35000}{35000} = \frac{-14000}{35000} = -0.4$

40% dec.

31. Savannah bought a $390 tablet. With sales tax, the total cost was $419.25. Find the sales tax percentage.

$\frac{419.25-390}{390} = \frac{29.25}{390} = 0.075$

7.5% tax

32. A certain lake is 85 feet deep. After a hurricane, the level of the lake rose to 88 feet. Find the percent of change in the depth of the lake. Round to the nearest tenth of a percent.

$\frac{88-85}{85} = \frac{3}{85} \approx 0.035$

3.5% increase

33. Jade bought a home for $129,500. She sold it fifteen years later for $9,000 less than twice the amount she had originally purchased it for. Find the percent of change in the purchase price of the home. Sale price: $250,000

$\frac{250\,000-129500}{129500} = \frac{120500}{129500} \approx 0.93$

93% inc.

Topic #4: Simple Interest

34. Thomas put $675 in a savings account that pays 3% simple interest. How much interest will he earn in twenty years?

$I = 675(0.03)(20)$

$I = \$405$

35. Stephanie borrowed $16,825 from the bank at a 5.2% interest rate to purchase a car. How much will she have paid in interest after five years?

$I = 16825(0.052)(5)$

$I = \$4374.50$

36. If $4,000 is invested in an account that earns 2.4% interest, find the total amount in the account after 8 years.

$I = 4000(.024)(8)$

$I = 768$

$4000 + 768 = \$4768$

37. Andy bought a $1,449 refrigerator using a store credit card with a 24% interest rate. If he did not charge anything else and took 18 months to pay, how much did he pay in total?

$I = 1449(.24)(1.5)$

$I = 521.64$

$1449 + 521.64 = \$1970.64$

38. Find the initial deposit into an account that earned $243 in fifteen years at an interest rate of 1.8% after.

$243 = P(.018)(15)$

$243 = .27P$

$900 = P$

$900

39. How long will it take a $2,500 investment to earn $1,000 in interest at a 4% interest rate?

$1000 = 2500(.04)t$

$1000 = 100t$

$10 = t$

10 years

40. How long will it take a $3,000 investment to triple in value at a 2.5% interest rate?

$6000 = 3000(.025)t$

$6000 = 75t$

$80 = t$

80 years

41. Cecil took out a 60-month loan for $9,500 to purchase a motorcycle. At the end of the loan, he had a paid a total of $11,827.50. Find the interest rate.

$2327.50 = 9500(r)(5)$

$2327.50 = 47500r$

$.049 = r \rightarrow 4.9\%$

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Pre-Algebra Review

QUIZ 4

Name: Key

Date: _____ **Per:** _____

1. A snowstorm brought 22 inches of snow to Buffalo in 12 hours, then 2 feet of snow to Rochester in 14 hours. Syracuse got 4 inches less snow than Buffalo in 8 hours. Which city had a heavier snowfall rate?

B: $\frac{22}{12} = 1.83$ R: $\frac{24}{14} = 1.71$ S: $\frac{18}{8} = 2.25$

A. Buffalo
B. Rochester
C. Syracuse
D. It was the same for all three cities.

2. Solve the proportion below. Write your answer in the box.

$$\frac{3.5}{20} = \frac{9.1}{x}$$

$3.5x = 182$

$x = 52$

$x = 52$

3. Alana drove 1,400 miles from Detroit to Miami. If her car averages 28 miles per gallon and the capacity of her gas tank is 24 gallons, how many times did she have to fill up her gas tank along the way, assuming she started with an empty tank?

$$\frac{28}{1} = \frac{1400}{x}$$

$28x = 1400$

$x = 50$ gallons

$50 \mid 24 = 2.08\overline{3}$

A. 1 time
B. 2 times
C. 3 times
D. 4 times

4. The scale on a map reads $\frac{3}{4}$ inch = 50 miles. If the actual the distance between two cities 325 miles, find the distance between the cities on the map. $\frac{0.75}{50} = \frac{x}{325}$ $x = 4.875$

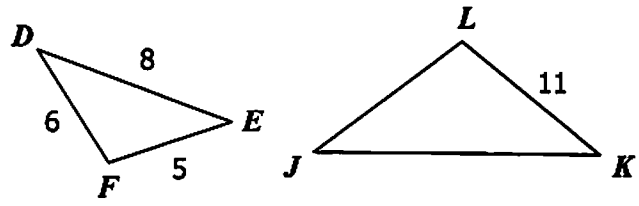
A. $4\frac{7}{8}$ inches
B. $4\frac{13}{16}$ inches
C. $4\frac{1}{2}$ inches
D. $4\frac{3}{4}$ inches

5. A company is manufacturing models of the Eiffel Tower to sell in gift shops. If the model needs to fit in a 1-foot tall box, and the actual height of the tower is 984 feet, which scale is best?

$\frac{1}{50} = \frac{x}{984}$; $x = 19.68$

A. 1 inch = 50 feet
B. 4 inches = 250 feet $\frac{4}{250} = \frac{x}{984}$; $x = 15.744$
C. 3 inches = 200 feet $\frac{3}{200} = \frac{x}{984}$; $x = 14.76$
D. 2 inches = 175 feet $\frac{2}{175} = \frac{x}{984}$; $x = 11.24$

6. If $\Delta DEF \sim \Delta JKL$, find JK.



$\frac{5}{11} = \frac{8}{x}$

$5x = 88$

$x = 17.6$

A. 14.7
B. 15.5
C. 17.6
D. 18.2

7. Elijah is 5'9" tall and casts a 4-foot shadow. He is standing near a tree that casts a 24-foot shadow. How tall is the tree?

$\frac{5.75}{4} = \frac{x}{24}$

$4x = 138$

$x = 34.5$

A. 30.2 feet
B. 32.8 feet
C. 34.5 feet
D. 36.1 feet

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8. Jordan's fish tank was only 62.5% full so he added some water to it so it got to 80% full. If the tank now has 40 gallons of water in it, how many gallons did he add?

$\frac{40}{x} = \frac{80}{100}$; $x = 50$

$50(0.625) = 31.25$

$40 - 31.25 = 8.75$

A. 8.25 gallons
B. 8.5 gallons
(C.) 8.75 gallons
D. 9 gallons

9. Ella bought a $379 tablet for 15% off. The next day, she saw that it was marked down an additional 20% off the sale price. How much more money would she have saved by waiting a day to purchase the tablet?

$379(0.85) = 322.15$

$322.15(.8) = 257.75$

$322.15 - 257.75 = 64.43$

A. $18.95
B. $24.52
C. $48.16
(D.) $64.43

10. Mr. Hillman is buying boxes of colored pencils for his classroom. They regularly cost $1.80 each but are on sale for 30% off. If sales tax is 6% and he has a $40 budget, how many boxes can be buy?

$1.8(.7) = 1.26$

$1.26(1.06) = 1.3356$

$\frac{40}{1.3356} = 29.95$

A. 27 boxes
B. 28 boxes
(C.) 29 boxes
D. 30 boxes

11. The bill for a group of eight people at a restaurant came to $196. Because they are a large party, the restaurant also adds an 18% tip on top of this. If they decide to equally split the bill, including the tip, how much will each person pay?

$196(1.18) = 231.28$

$231.28 / 8 = 28.91$

(A.) $28.91
B. $29.35
C. $30.77
D. $31.08

12. When Martin started his job in 2007, his salary was $40,000. In 2016, his salary was $72,000. What is the percent increase of his salary from 2007 to 2016? Write your answer in the box.

$\frac{72{,}000 - 40000}{40000}$

$\frac{32000}{40000} = 0.8$

80%

13. The table below shows the total rainfall in 2015 and the total rainfall in 2016 for four different cities. Which city had the greatest percent decrease in rainfall from 2015 to 2016?

City	Total 2015 Rainfall (in)	Total 2016 Rainfall (in)
Greystone	53.2	49.7
Sierra	45.8	42.9
Lakeville	43.5	41.2
Ashland	50.4	46.8

A. Greystone $\approx 6.6\%$
B. Sierra $\approx 6.3\%$
C. Lakeville $\approx 5.2\%$
(D.) Ashland $\approx 7.1\%$

14. Stacy put $650 in a bank account that earns 7% simple interest. How much total will she have in the account after 20 years?

$650(.07)(20) = 910$

$910 + 650 = 1560$

A. $910
(B.) $1,560
C. $1,820
D. $1,995

15. Ian took out a 60-month loan from the bank to purchase a $27,000 car. If the simple interest rate is 4.5%, how much would he save if he pays the car off in three years instead of the entire length of the loan?

$27000(0.045)(5) = 6075$

$27000(0.045)(3) = 3645$

$6075 - 3645 = 2430$

A. $2,190
(B.) $2,430
C. $2,550
D. $2,620

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Name: _____ **Pre-Algebra Review:** Packet #5

Topic #1: Relations & Functions

Identify the domain and range of each relation, then determine if the relation is a function.

1.

{(-7, -1), (-4, 2), (0, 5), (4, -1)}

Domain: {-7, -4, 0, 4}

Range: {-1, 2, 5}

Function? yes

2.

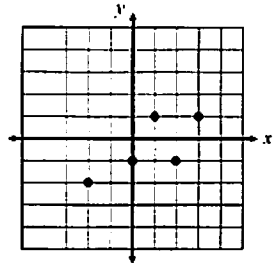
x	y
2	-4
-5	2
9	0
2	-1
1	4

Domain: {-5, 1, 2, 9}

Range: {-4, -1, 0, 2, 4}

Function? No

3.



Domain: {-3, 0, 1, 2, 3}

Range: {-2, -1, 1}

Function? yes

Topic #2: Equations as Functions

Given the function and its domain, find the range.

4. $y = -4x + 5$; domain = {-7, -1, 2}

$y = -4(-7) + 5 = 33$

$y = -4(-1) + 5 = 9$

$y = -4(2) + 5 = -3$

{-3, 9, 33}

5. $y = \frac{3}{2}x - 1$; domain = {-10, -6, -2}

$y = \frac{3}{2}(-10) - 1 = -16$

$y = \frac{3}{2}(-6) - 1 = -10$

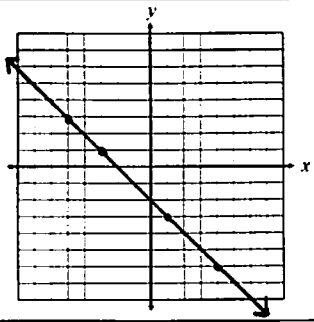
$y = \frac{3}{2}(-2) - 1 = -4$

{-16, -10, -4}

Complete each function table, then graph.

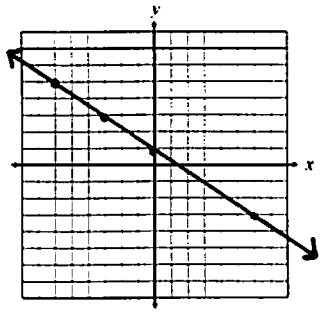
6. $y = -2 - x$

x	y
-5	3
-3	1
1	-3
4	-6



7. $y = 1 - \frac{2}{3}x$

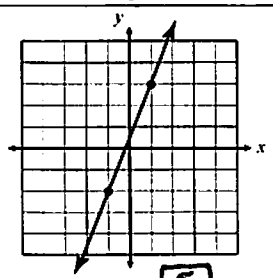
x	y
-6	5
-3	3
0	1
6	-3



Topic #3: Slope

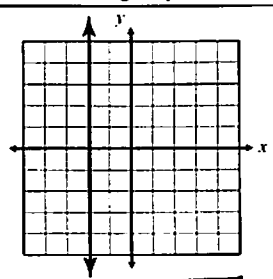
Find the slope of the line given the graph.

8.



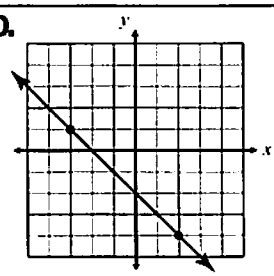
$\frac{5}{2}$

9.



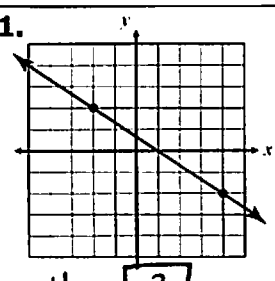
undef

10.



$\frac{-5}{5} = -1$

11.



$\frac{-4}{6} = \frac{-2}{3}$

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Given any two points (x_1, y_1) and (x_2, y_2), you can find the slope of the line that passes through the points using the **slope formula.**

SLOPE FORMULA

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Find the slope of the line that passes through the given points.

12. (2, -1) and (-2, -9)

$m = \frac{-9+1}{-2-2} = \frac{-8}{-4} = 2$

13. (7, 3) and (2, 3)

$m = \frac{3-3}{2-7} = \frac{0}{-5} = 0$

14. (4, -3) and (-11, 9)

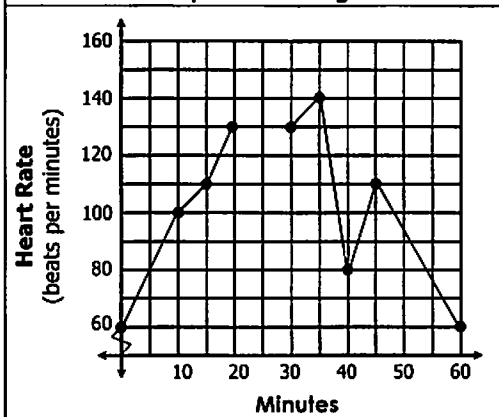
$m = \frac{9+3}{-11-4} = \frac{12}{-15} = -\frac{4}{5}$

15. (-4, 6) and (-4, 7)

$m = \frac{7-6}{-4+4} = \frac{1}{0} =$ undef

In real world contexts, slope is often referred to as rate of change!

16. Bailey exercised at the gym for 60 minutes. The graph below shows her heart rate, in beats per minute, at certain points during her workout.



a) Find the rate of change in her heart rate in the first 10 minutes of her workout.

(0, 60)
(10, 100)

$m = \frac{100-60}{10-0} = \frac{40}{10} =$ 4 bpm/min

b) Find the rate of change in her heart rate from 45 to 60 minutes.

(45, 110)
(60, 60)

$m = \frac{60-110}{60-45} = \frac{-50}{15} = \frac{-10 \text{ bpm}}{3 \text{ min}}$

c) Find the rate of change in her heart rate from 20 to 30 minutes.

(20, 130)
(30, 130)

$m = \frac{130-130}{30-20} = \frac{0}{10} =$ 0 bpm/min

17. At 2:40 p.m. a plane at an altitude of 30,000 feet begins its descent. At 2:48 p.m., the plane is at 25,000 feet. Find the rate in change in the altitude of the plane during this time.

$\frac{25{,}000 - 30{,}000}{8} = \frac{-5000}{8} =$ -625 ft/min

18. On the first day of May, Eric's bank account balance was $533.70. On the last day of the same month, his balance was $804.95. Find the rate of change in his balance during this time.

$\frac{804.95 - 533.70}{31} = \frac{271.25}{31} =$ $8.75/day

Topic #4: Graphing Linear Equations: Slope-Intercept Form, Standard Form, Vertical & Horizontal Lines

Linear equations are often written in **slope-intercept form** where m is the slope and b is the y-intercept

SLOPE-INTERCEPT FORM

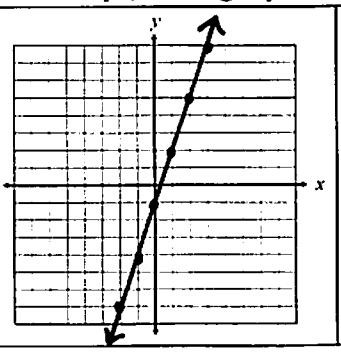
$y = mx + b$

Identify the slope and y-intercept, then graph the equation.

19. $y = 3x - 1$

$m = 3$

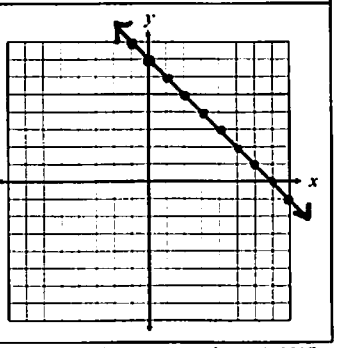
$b = -1$



20. $y = -x + 7$

$m = -1$

$b = 7$



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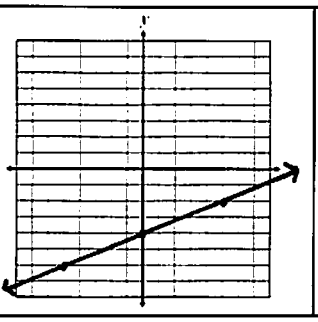
21. $y = \frac{2}{5}x - 4$

$m = \frac{2}{5}$

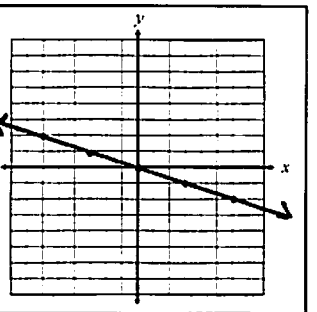
$b = -4$



22. $y = -\frac{1}{3}x$

$m = \frac{-1}{3}$

$b = 0$



Linear equations are also often written in **standard form.**
You can convert these to slope-intercept form by solving for y.

STANDARD FORM

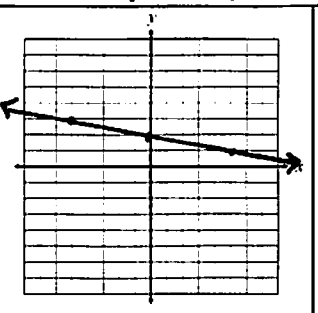
$Ax + By = C$

Write the equation in slope-intercept form, then graph.

23. $x + 5y = 10$

$5y = -x + 10$

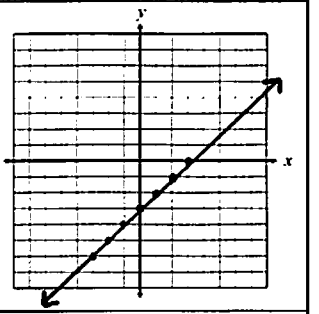
$y = -\frac{1}{5}x + 2$



24. $x - y = 3$

$-y = -x + 3$

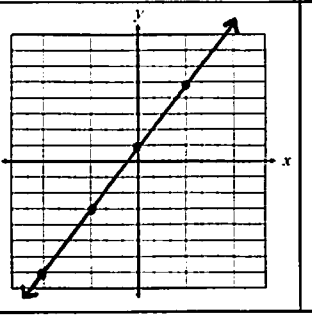
$y = x - 3$



25. $8x - 6y = -6$

$-6y = -8x - 6$

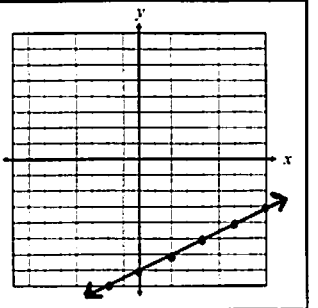
$y = \frac{4}{3}x + 1$



26. $x - 2y = 14$

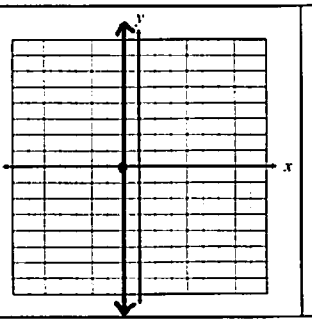
$-2y = -x + 14$

$y = \frac{1}{2}x - 7$

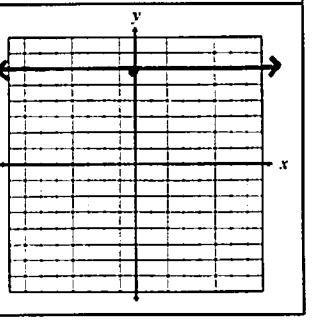


Graph each line.

27. $x = -1$



28. $y = 6$



Topic #5: Slope-Intercept Form Applications

29. A photo printing website charges a flat rate of $3 for shipping, then $0.18 per printed photo. Elena just returned from a trip to Europe and would like to print her pictures. Write an equation to show the total amount she will pay, then answer the following questions.

$y = 0.18x + 3$

a) What is the rate of change? 0.18

b) What is the initial value? 3

c) What is the independent variable? # photos

d) What is the dependent variable? costs

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30. Carly baked a pizza in her oven at 450°F. Once the pizza was done and she turned the oven off, the temperature decreased at a rate of 8° per minute. Write an equation that gives the temperature of the oven each minute after she turned it off, then answer the following questions.

$y = -8x + 450$

a) Find the temperature of the oven after 15 minutes.

$y = -8(15) + 450$

$= \boxed{330°}$

b) Find the number of minutes it will take the oven to reach a temperature of 72° F.

$72 = -8x + 450$

$-378 = -8x$

$x = \boxed{47.25 \text{ min}}$ (47 min, 15 sec)

Topic #6: Direct Variation

A **direct variation** (or proportional relationship) is a special type of linear function in which there is a constant rate of change between the variables ($\frac{y}{x} = k$) and the y-intercept is always 0.

DIRECT VARIATION

$y = k \cdot x$

Determine if the values in the table represent a direct variation. If yes, identify the constant of variation and write an equation to represent the relationship.

31.

x	y
0	0
1	2
2	4
3	6

yes; $k = 2$

$y = 2x$

32.

x	y
-2	1
-1	0
0	-1
1	-2

No

33.

Ounces	Cost
2	\$0.80
5	\$2.00
8	\$3.20
12	\$4.80

yes; $k = 0.4$

$y = 0.4x$

34.

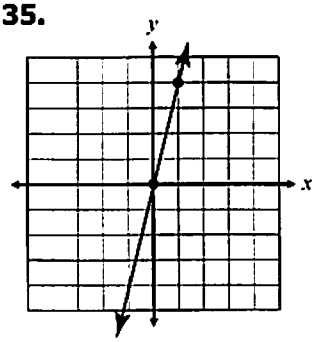
Time (s)	Depth (ft)
0	0
5	-15
10	-30
15	-45

yes; $k = -3$

$y = -3x$

Determine if the graph represents a direct variation. If yes, identify the constant of variation and write an equation to represent the relationship.

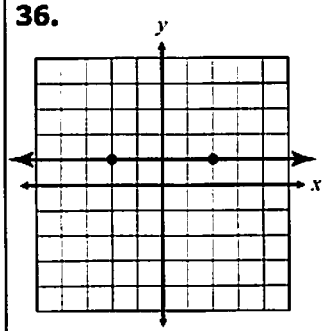
35.



yes; $k = 4$

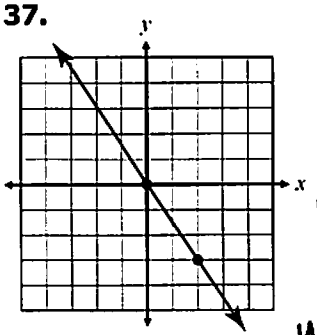
$y = 4x$

36.



No

37.



yes; $k = -\frac{3}{2}$

$y = -\frac{3}{2}x$

Determine if the equation represents a direct variation. If yes, identify the constant of variation.

38. $\frac{y}{x} = -3$

$y = -3x$

yes; $k = -3$

39. $2x + 2y = 2$

$2y = -2x + 2$

$y = -x + 1$

No

40. $\frac{y}{x} = -\frac{5}{3}$

$3y = -5x$

$y = -\frac{5}{3}x$

yes; $k = -\frac{5}{3}$

41. $xy = 9$

$y = \frac{9}{x}$

No

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42. The distance traveled by a train varies directly to the length of time it travels. If it took the train 8 hours to travel 472 miles, identify the constant of variation and write an equation to represent the relationship.

let y = distance
let x = time

$\frac{472}{8} = 59$

$y = 59x$

43. The height of a television varies directly with its width. If a television has a height of 27 inches and a width of 48 inches, identify the constant of variation and write an equation to represent the relationship.

let y = height
let x = width

$\frac{27}{48} = \frac{9}{16}$

$y = \frac{9}{16}x$

44. The amount of money that Kailyn earns varies directly with the number of hours she works. If she works for 15 hours and makes 146.25, how much will she make in 40 hours?

let y = earnings
let x = hr worked

$\frac{146.25}{15} = 9.75$

$y = 9.75x$

$y = 9.75(40) = \$390$

45. Weight on Mars varies directly with weight on Earth. If an astronaut that weighs 200 pounds on Earth weighs 76 pounds on Mars, find the weight of an astronaut on Mars who weighs 230 pounds on Earth.

let y = Mars
let x = Earth

$\frac{76}{200} = .38$

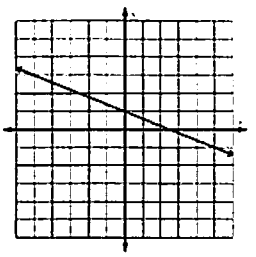
$y = .38x$

$y = .38(230) =$ 87.4 lb

Topic #7: Linear vs. Nonlinear Functions

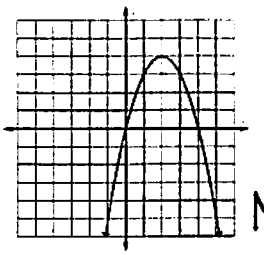
Determine if the graph, equation, or table represents a linear or nonlinear function.

46.



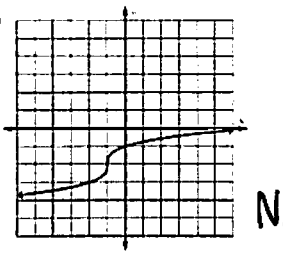
Linear

47.



Nonlinear

48.



Nonlinear

49. $y = x^2$

Nonlinear

50. $y = -5x + 1$

Linear

51. $2x - 7y = 0$

Linear

52. $y = \frac{8}{x}$

Nonlinear

53. $y = -5 - \frac{x}{3}$

Linear

54. $x^3 - x^2 = 2y$

Nonlinear

55.

x	y
1	6
4	5
7	4
10	3

Linear

56.

x	y
2	1
4	8
6	18
8	24

Nonlinear

57.

x	y
3	-4
-2	-1
-7	2
-12	5

Nonlinear

Pre-Algebra Review

QUIZ 5

Name: _____

Date: _____ **Per:** _____

1. Which relation represents a function?

A.

x	1	1	1	1
y	-2	0	2	4

B.

x	0	2	4	2
y	-4	-3	-2	-1

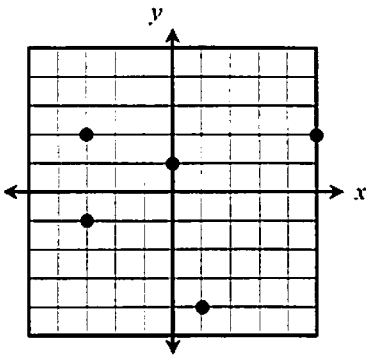
C.

x	-5	-4	-3	-5
y	3	3	3	3

D.

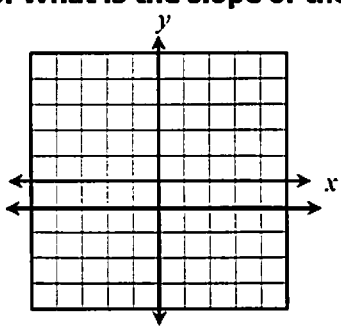
x	-3	-1	0	4
y	-3	-1	0	4

2. Which value is not in the range of the relation shown below?



A. -3
B. -1
C. 1
D. 2

3. What is the slope of the line on the graph?



A. -1
B. 1
C. 0
D. undefined

4. Find the slope of the line that passes through the points (2, -1) and (-2, 9). Write your answer as a fraction in simplest form.

$m = \frac{9+1}{-2-2} = \frac{10}{-4}$

$-5/2$

5. Find the slope of the line that passes through the points (-6, 5) and (-6, 8).

A. -1/4
B. 1/4
C. 0
D. undefined

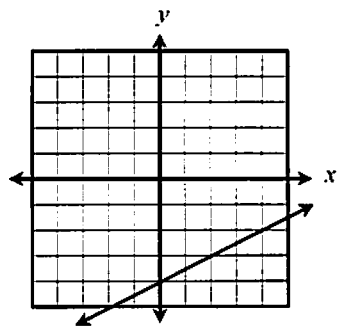
$m = \frac{8-5}{-6+6} = \frac{3}{0}$

6. At 11:59 p.m. on December 31st, the Times Square Ball in New York City was 725 feet above ground. One minute later, it was 584 feet above ground. Which of the following gives the rate of change of the ball in feet per second?

A. 2.35 ft/s
B. -2.35 ft/s
C. 2.82 ft/s
D. -2.82 ft/s

$m = \frac{584-725}{60} = \frac{-141}{60}$

7. Which equation best represents the line shown on the graph?

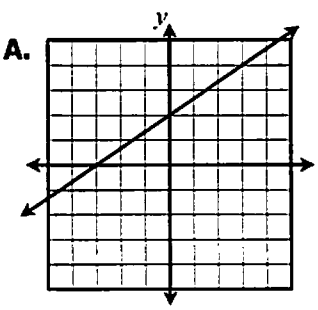


A. $y = -4 - \frac{1}{2}x$
B. $y = -4x + 2$
C. $y = \frac{1}{2}x - 4$
D. $y = 2x - 4$

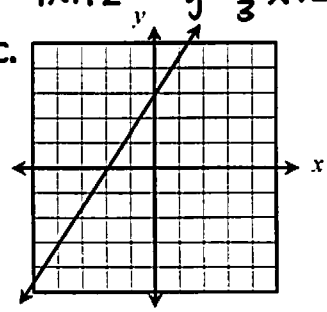
8. Which graph best represents the equation $4x + 6y = 12$?

$6y = -4x + 12 \quad y = \frac{-2}{3}x + 2$

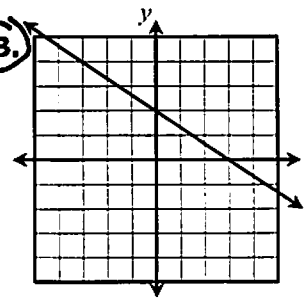
A.



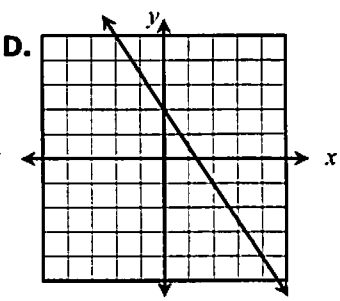
C.



B.



D.



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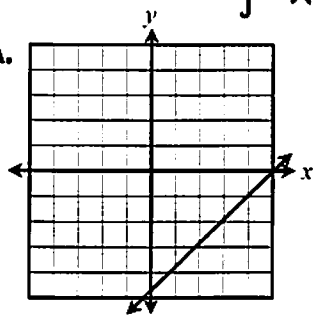
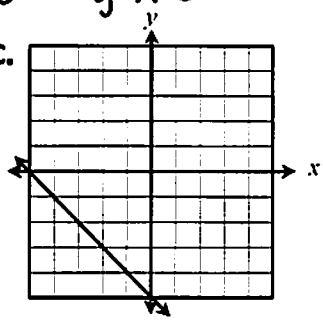
9. Which graph best represents the equation $x - y = -5$? $-y = -x - 5$ $y = x - 5$

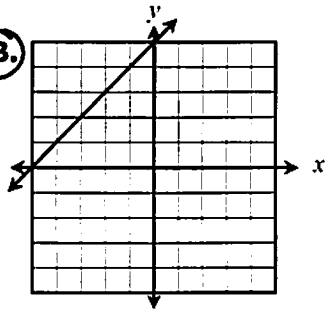
A.



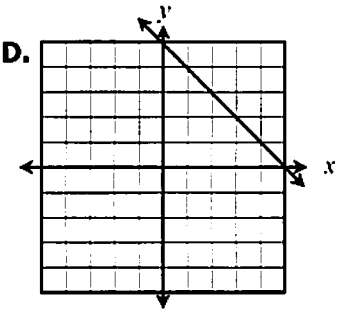
C.



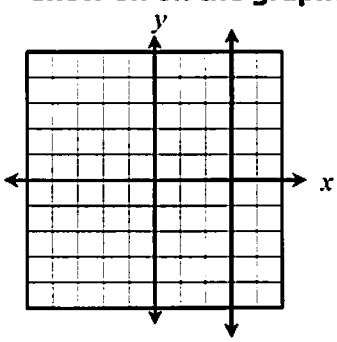
B.



D.



10. Which equation best represents the line show on on the graph?



A. $y = 3x$

B. $y = 3$

C. $x = 3$

D. $x = 1$

Use for questions 11-13: Aiden weighed 7.2 pounds at birth. In his first year, he gained 1.5 pounds per month.

11. If y represents Aiden's weight at x months, write an equation in slope-intercept form that gives Aiden's weight each month.

$y = 1.5x + 7.2$

12. Which of the following represents the dependent variable?

A. weight

B. months

C. 7.2

D. 1.5

13. How much did Aiden weigh at 9 months old?

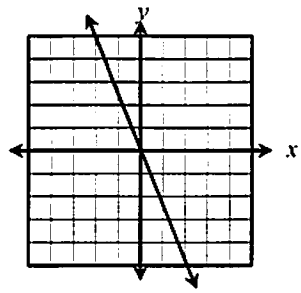
$y = 1.5(9) + 7.2$

20.7 lb

14. Which of the following does not show a direct variation relationship?

A. $4x - 3y = 0$

C.



B.

x	y
-1	-2
0	0
1	-2
2	-4

D.

Download Speeds	
Seconds	Megabits
5	39
25	195
40	312
60	468

15. The amount of vinegar, v, added to water to create a cleaning solution varies directly to the amount of water, w. For 8 cups of water, ½ cup of vinegar is added. Which of the following equations represents this relationship? $\frac{\frac{1}{2}}{8} = \frac{1}{16}$

A. $v = \frac{1}{16}w$

B. $v = \frac{1}{4}w$

C. $v = 16w$

D. $v = 4w$

16. Which of the following represents a linear function?

A. $x^2 - 2y^2 = 6$

C. $xy = -4$

B.

x	y
0	0
2	1
4	2
6	8

D.

x	y
-4	5
1	2
6	-1
11	-4

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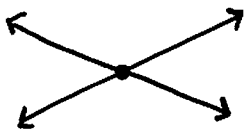
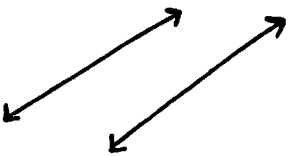
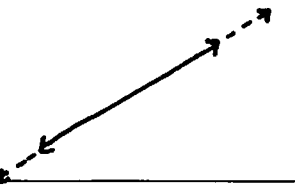
Name: _____ **Pre-Algebra Review:** Packet #6

Topic #1: Types of Solutions to a System of Equations

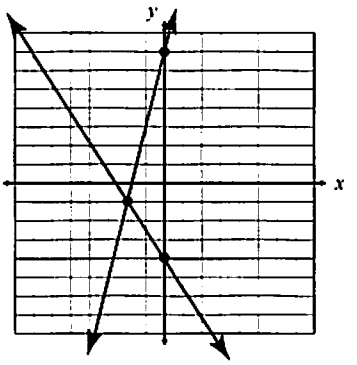
Sketch and label the three types of solutions possible for a system of equations.

		
One Solution (x,y)	No Solution $(\emptyset)$	Infinite Solutions (∞)

Topic #2: Writing Systems of Equations & Identifying Solution

Write a system of equations given the graph, then identify the solution.

1.

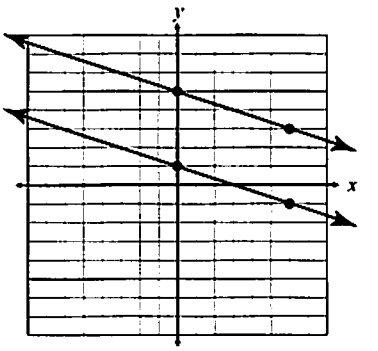


$y = 4x + 7$

$y = -\frac{3}{2}x - 4$

Solution: $(-2, -1)$

2.



$y = -\frac{1}{3}x + 5$

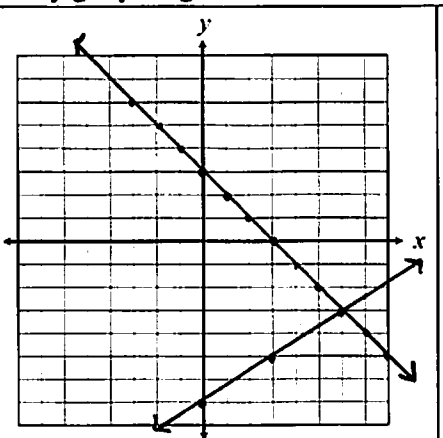
$y = -\frac{1}{3}x + 1$

Solution: $\emptyset$

Topic #3: Solving Systems of Equations by Graphing

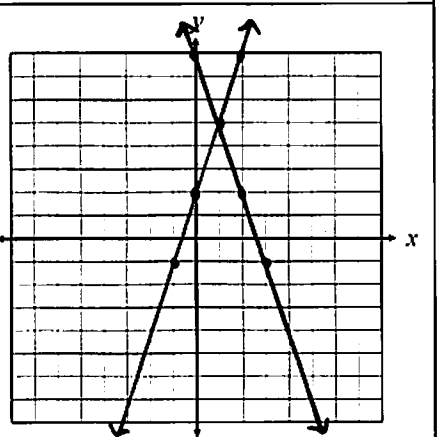
Solve each system by graphing. Be sure to clearly give the solution.

3. $\begin{cases} y = -x + 3 \\ y = \frac{2}{3}x - 7 \end{cases}$



$(6, -3)$

4. $\begin{cases} y = 3x + 2 \\ y = -3x + 8 \end{cases}$



$(1, 5)$

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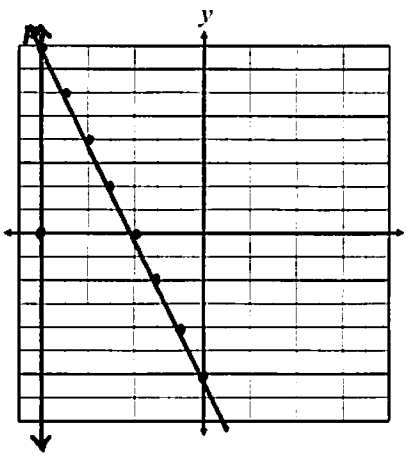
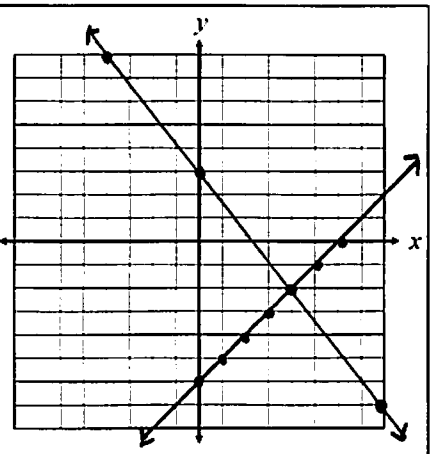
5. $\begin{cases} y = -2x - 6 \\ x = -7 \end{cases}$



(-7, 8)

6. $\begin{cases} y = -\frac{5}{4}x + 3 \\ y = x - 6 \end{cases}$



(4, -2)

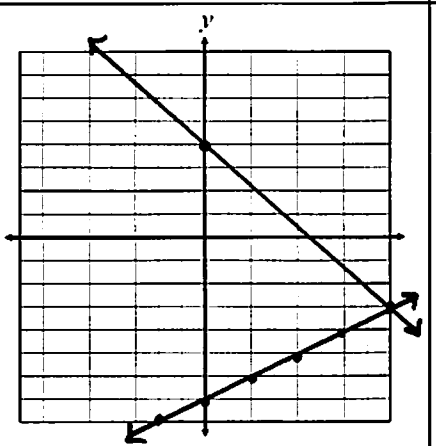
7. $\begin{cases} x - 2y = 14 \\ 7x + 8y = 32 \end{cases}$

$-2y = -x + 14$

$y = \frac{1}{2}x - 7$

$8y = -7x + 32$

$y = \frac{-7}{8}x + 4$



(8, -3)

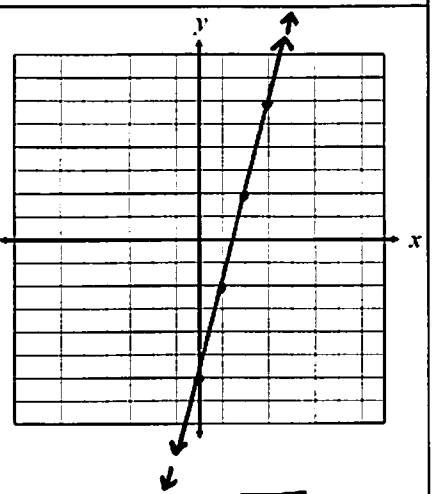
8. $\begin{cases} 8x - 2y = 12 \\ 4x - y = 6 \end{cases}$

$-2y = -8x + 12$

$y = 4x - 6$

$-y = -4x + 6$

$y = 4x - 6$



∞

Topic #4: Solving Systems of Equations Algebraically

Solve each system by SUBSTITUTION. Be sure to clearly give the solution.

9. $\begin{cases} y = -3x + 13 \\ y = -x + 1 \end{cases}$

$-3x + 13 = -x + 1$

$13 = 2x + 1$

$12 = 2x$

$x = 6$

$y = -(6) + 1$

$y = -5$

(6, -5)

10. $\begin{cases} y = 7x + 20 \\ 4x - y = -11 \end{cases}$

$4x - (7x + 20) = -11$

$4x - 7x - 20 = -11$

$-3x - 20 = -11$

$-3x = 9$

$x = -3$

$y = 7(-3) + 20$

$y = -21 + 20$

$y = -1$

(-3, -1)

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11. $\begin{cases} -4x+3y=29 \\ 5x+y=-3 \end{cases}$ → $y=-5x-3$

$-4x+3(-5x-3)=29$

$-4x-15x-9=29$

$-19x=38$

$x=-2$

$y=-5(-2)-3$

$y=7$

$(-2,7)$

12. $\begin{cases} x-3y=4 \\ 2x-5y=8 \end{cases}$ → $x=3y+4$

$2(3y+4)-5y=8$

$6y+8-5y=8$

$y+8=8$

$y=0$

$x=3(0)+4$

$x=0+4$

$x=4$

$(4,0)$

Solve each system by ELIMINATION. Be sure to clearly give the solution.

13. $\begin{cases} y=-2x-3 \\ y=7x+6 \end{cases}$

$-(\quad\quad)$

$0=-9x-9$

$9=-9x$

$-1=x$

$y=-2(-1)-3$

$y=2-3$

$y=-1$

$(-1,-1)$

14. $\begin{cases} x+3y=3 \\ x-5y=-29 \end{cases}$

$-(\quad\quad)$

$8y=32$

$y=4$

$x+3(4)=3$

$x+12=3$

$x=-9$

$(-9,4)$

15. $\begin{cases} 4x+y=10 \\ 7x+2y=17 \end{cases}$ → $8x+2y=20$

$-(7x+2y=17)$

$x=3$

$4(3)+y=10$

$12+y=10$

$y=-2$

$(3,-2)$

16. $\begin{cases} 3x-12y=6 \\ x-4y=2 \end{cases}$ → $3x-12y=6$

$-(3x-12y=6)$

$0=0$

∞

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Topic 5: Solving Systems of Equations Applications

17. The sum of two numbers is 75. If the larger number is three more than twice the smaller number, find both numbers.

Variables:
let x = smaller #
let y = larger #

System:
$x+y=75$
$y=2x+3$

Solve:
$x+2x+3=75$
$3x+3=75$
$3x=72$
$x=24$

$24+y=75$
$y=51$

Solution: 24 & 51

18. At the school bookstore, Rylan bought two spiral notebooks and one folder and paid $6.70. Olivia bought three spiral notebooks and five folders and paid $12.85. Find the cost of each folder.

Variables:
let x = notebook
let y = folder

System:
$2x+y=6.70$
$3x+5y=12.85$

Solve:
$10x+5y=33.50$
$-(3x+5y=12.85)$
$7x=20.65$
$x=2.95$

$2(2.95)+y=6.70$
$5.90+y=6.70$
$y=0.80$

Solution: $0.80 | folder

19. In her last workout, Marsha burned 9 calories per minute on the treadmill and 7 calories per minute on the elliptical. If she spent a total of 57 minutes working out and burned a total of 463 calories, how many minutes did she spend on the elliptical?

Variables:
x = treadmill
y = elliptical

System:
$x+y=57$
$9x+7y=463$

Solve:
$7x+7y=399$
$-(9x+7y=463)$
$-2x=-64$
$x=34$

$34+y=57$
$y=23$

Solution: 23 min

20. A restaurant has booths that can sit four people and tables that can seat six people. In total, the restaurant has 37 seating options and can seat 190 people. Find the number of tables in the restaurant.

Variables:
let x = booth
let y = table

System:
$x+y=37$
$4x+6y=190$

Solve:
$4x+4y=148$
$-(4x+6y=190)$
$-2y=-42$
$y=21$

Solution: 21 tables

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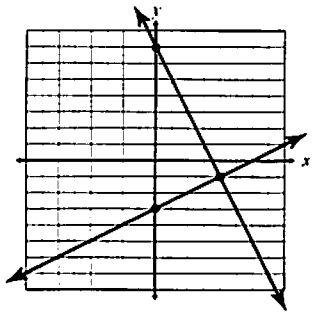
Pre-Algebra Review

QUIZ 6

Name: _____

Date: _____ **Per:** _____

Use the graph to the right for questions 1-2:



1. Which two equations represent this system?

☐ $y = 2x - 3$	☑ $y = -2x + 7$
☐ $y = -\frac{1}{2}x + 7$	☐ $x - 2y = -6$
☑ $x - 2y = 6$ $-2y = -x + 6$	☐ $2x - y = 7$

$y = \frac{1}{2}x - 3$

2. What is the solution to the system? Write your answer in the box.

(4 , -1)

3. Three systems of equations are given below. Write the letter of the type of solution that each system has in each box below the system.

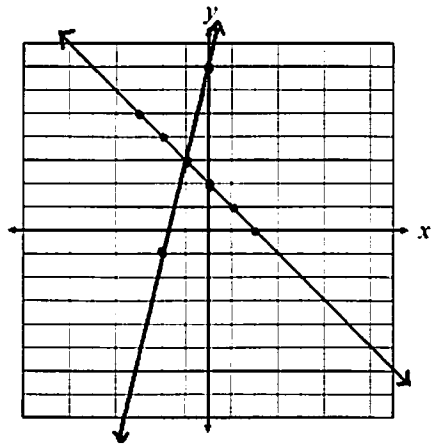
$\begin{cases} 3x + 3y = 15 \\ y = -x + 5 \end{cases}$ C

$\begin{cases} 3x - y = 5 \\ x - 3y = 15 \end{cases}$ A

$\begin{cases} 3x - y = 9 \\ y = 3x + 9 \end{cases}$ B

Types of Solutions:
A – One Solution
B – No Solution
C – Infinite Solutions

4. Use the graph below to determine which system of equations would have a solution in the second quadrant.



A. $\begin{cases} y = x - 7 \\ y = -x + 3 \end{cases}$

B. $\begin{cases} y = x - 1 \\ y = -\frac{1}{4}x - 6 \end{cases}$

C. $\begin{cases} y = -x + 2 \\ 4x - y = -7 \end{cases}$ → $y = 4x + 7$

D. $\begin{cases} x + 2y = 14 \\ y = \frac{3}{2}x - 5 \end{cases}$

5. Solve the system of equations algebraically. Write your answer in the box.

$\begin{cases} y = x + 1 \\ y = -4x - 14 \end{cases}$

$x + 1 = -4x - 14$
$5x + 1 = -14$
$5x = -15$
$x = -3$

$y = -3 + 1$

(-3 , -2)

6. Find the value of x in the solution to the system of equations shown below.

$\begin{cases} 2x - 5y = 34 \\ y = 3x - 25 \end{cases}$

$2x - 5(3x - 25) = 34$
$2x - 15x + 125 = 34$
$-13x = -91$
$x = 7$

A. -4
B. 7
C. -7
D. 3

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7. Find the solution to the system of equations.

$\begin{cases} x - 2y = -20 \\ x - 5y = -47 \end{cases}$

$3y = 27$

$y = 9$

$x - 2(9) = -20$

$x - 18 = -20$

$x = -2$

(A.) (-2, 9)
B. (2, -9)
C. (9, -2)
D. (-9, 2)

8. Find the solution to the system of equations.

$\begin{cases} 3x + y = -17 \\ 4x - 9y = -2 \end{cases}$ → $y = -3x - 17$

$4x - 9(-3x - 17) = -2$

$4x + 27x + 153 = -2$

$31x = -155$

$x = -5$

$y = -3(-5) - 17$

$y = 15 - 17$

$y = -2$

A. (2, -5)
B. (-5, 2)
C. (-2, -5)
(D.) (-5, -2)

9. Find the solution to the system of equations.

$\begin{cases} 5x - y = -2 \\ y = -5x - 8 \end{cases}$

$5x - (-5x - 8) = -2$

$5x + 5x + 8 = -2$

$10x = -10$

$x = -1$

$y = -5(-1) - 8$

$y = 5 - 8$

$y = -3$

A. (-3, -1)
(B.) (-1, -3)
C. No Solution
D. Infinite Solutions

10. Find the solution to the system of equations.

$\begin{cases} y = 2x - 8 \\ 6x - 3y = 24 \end{cases}$

$6x - 3(2x - 8) = 24$

$6x - 6x + 24 = 24$

A. (0, 8)
B. (8, 0)
C. No Solution
(D.) Infinite Solutions

11. A certain airplane offers two types of seats, first class and economy. There are 209 total seats on the airplane. If the difference between the number of economy and first class seats is 153, find the number of economy seats.

let x = economy
let y = 1st class

$x + y = 209$

$x - y = 153$

$2x = 362$

$x = 181$

A. 28
B. 45
C. 164
(D.) 181

12. It costs $31.25 for one box of candy and four large bags of popcorn at the movie theater. For three boxes of candy and five large bags of popcorn, it costs $46.50. How much does a large bag of popcorn cost?

let x = candy
let y = popcorn

$x + 4y = 31.25$

$3x + 5y = 46.50$

$3x + 12y = 93.75$

$-(3x + 5y = 46.50)$

$7y = 47.25$

$y = 6.75$

A. $4.25
B. $5.50
(C.) $6.75
D. $7.25

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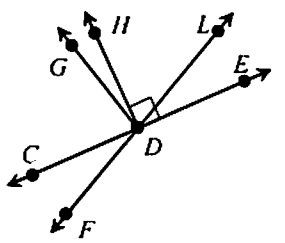
Name: _____ **Pre-Algebra Review:** Packet #7

Topic #1: Basic Angle Relationships

1. Using the diagram below, classify each angle pair as vertical, adjacent, congruent, complementary, or supplementary angles. Use all names that apply.



a) $\angle CDG$ and $\angle GDH$: Adjacent, Complimentary

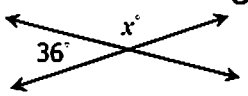
b) $\angle CDL$ and $\angle FDE$: Vertical

c) $\angle GDH$ and $\angle HDL$: Adjacent

d) $\angle CDF$ and $\angle FDE$: Adjacent, Supplementary

Find the missing measure.

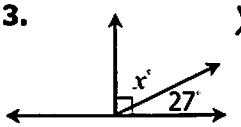
2.



$36 + x = 180$

$x = 144°$

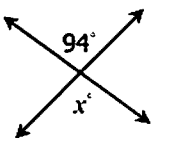
3.



$x + 27 = 90$

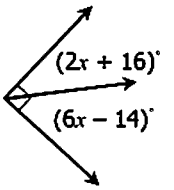
$x = 63°$

4.



$x = 94°$

5. Solve for x.



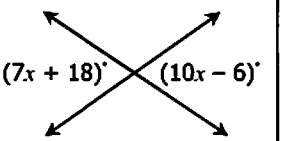
$2x + 16 + 6x - 14 = 90$

$8x + 2 = 90$

$8x = 88$

$\boxed{x = 11}$

6. Solve for x.



$7x + 18 = 10x - 6$

$18 = 3x - 6$

$24 = 3x$

$\boxed{x = 8}$

7. If $m\angle LNK = (4x - 9)°$ and $m\angle KNM = (10x - 21)°$, find $m\angle LNJ$.

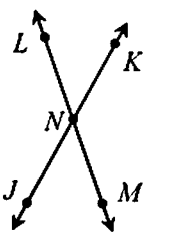
$4x - 9 + 10x - 21 = 180$

$14x - 30 = 180$

$14x = 210$

$x = 15$

$10(15) - 21 = \boxed{129°}$



8. If $\angle P$ and $\angle Q$ are supplementary angles and $m\angle Q = 47°$, find $m\angle P$.

$x + 47 = 180$

$x = \boxed{133°}$

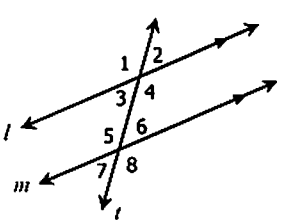
9. If $\angle 1$ and $\angle 2$ are vertical angles, $\angle 2$ and $\angle 3$ are complemetary angles, and $m\angle 1 = 26°$, find $m\angle 3$.

$x + 26 = 90$

$x = \boxed{64°}$

Topic #2: Parallel Lines Cut a Transversal

10. Using the diagram below, classify each angle pair as alternate interior, alternate exterior, corresponding, or consecutive interior angles. If no relationship exists, write "none".



a) $\angle 3$ and $\angle 7$: Corresponding

b) $\angle 4$ and $\angle 5$: alternative interior

c) $\angle 4$ and $\angle 6$: Consecutive interior

d) $\angle 2$ and $\angle 5$: None

e) $\angle 2$ and $\angle 6$: Corresponding

f) $\angle 1$ and $\angle 8$: alternate exterior

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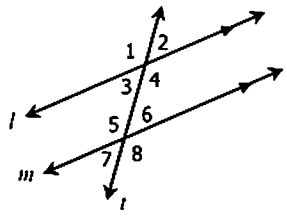
11. In the diagram below, if $m\angle 5 = 118^\circ$, find each angle measure.



$m\angle 1 =$ 118°	$m\angle 6 =$ 62°
$m\angle 2 =$ 62°	$m\angle 7 =$ 62°
$m\angle 3 =$ 62°	$m\angle 8 =$ 118°
$m\angle 4 =$ 118°	

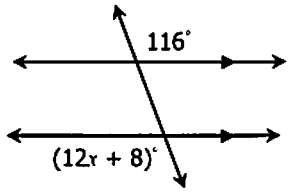
Solve for x.

12.

$12x + 8 = 116$

$12x = 108$

$\boxed{x = 9}$



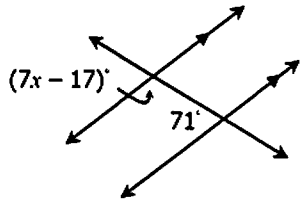
13.

$7x - 17 + 71 = 180$

$7x + 54 = 180$

$7x = 126$

$\boxed{x = 18}$



Find $m\angle 1$.

14.

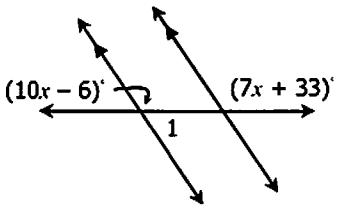
$10x - 6 = 7x + 33$

$3x = 39$

$x = 13$

$10(13) - 6 = 124$

$\boxed{m\angle 1 = 56^\circ}$



15.

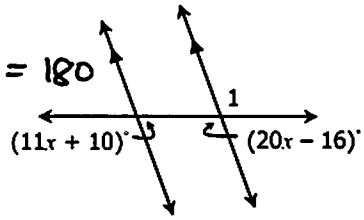
$11x + 10 + 20x - 16 = 180$

$31x - 6 = 180$

$31x = 186$

$x = 6$

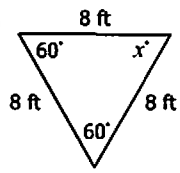
$20(6) - 16 = \boxed{104^\circ}$



Topic #3: Triangles & The Pythagorean Theorem

Find each missing angle measure, then classify the triangle by its angles and its sides.

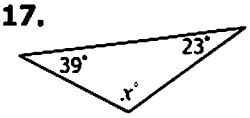
16.



$x = 60^\circ$

Equilateral, Equiangular

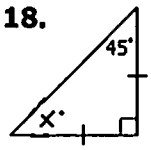
17.



$x = 118^\circ$

Obtuse, Scalene

18.



$x = 45^\circ$

Right, Isosceles

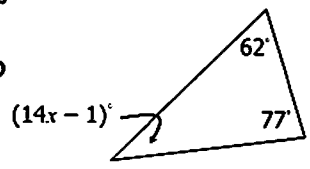
19. Solve for x.

$14x - 1 + 62 + 77 = 180$

$14x + 138 = 180$

$14x = 42$

$\boxed{x = 3}$



20. Find $m\angle B$.

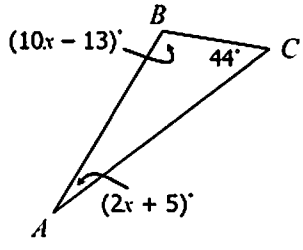
$10x - 13 + 2x + 5 + 44 = 180$

$12x + 36 = 180$

$12x = 144$

$x = 12$

$m\angle B = 10(12) - 13 = \boxed{107^\circ}$



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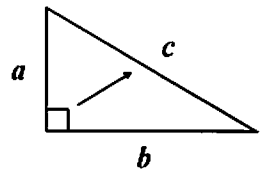
Pythagorean Theorem:

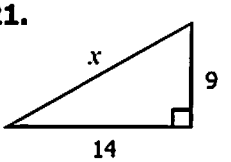


$a^2+b^2=c^2$

where *a* and *b* are the legs **and *c*, the longest side, is the** hypotenuse

Find the missing side length. Round to the nearest tenth if necessary.

21.

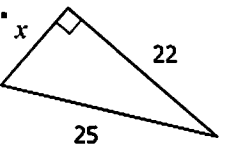


$14^2+9^2=x^2$

$277=x^2$

$x=16.6$

22.

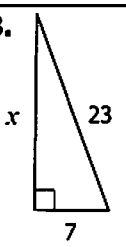


$x^2+22^2=25^2$

$x^2=141$

$x=11.9$

23.

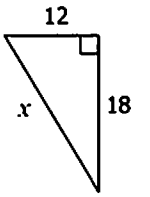


$x^2+7^2=23^2$

$x^2=480$

$x=21.9$

24.



$12^2+18^2=x^2$

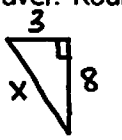
$468=x^2$

$21.6=x$

25. Determine whether the side lengths could form a right triangle. Check all that apply.

- ☐ 7, 10, 15 — $149 \neq 225$
- ☐ 16, 30, 32 — $1156 \neq 1024$
- ☑ 12, 16, 20 — $400=400$
- ☑ 5, 12, 13 — $169=169$
- ☐ 18, 25, 31 — $949 \neq 961$

26. A ship leaves a port and sails eight miles north, then three miles west. If it needs to return to the port, what is the minimum distance it must travel? Round to the nearest tenth of a mile.

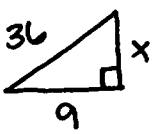


$3^2+8^2=x^2$

$73=x^2$

$x=8.5\text{ mi}$

27. A 36-foot wire is attached from the top of a pole to a bracket that is 9 feet from the base of the pole. How tall is the pole? Round to the nearest tenth of a foot.



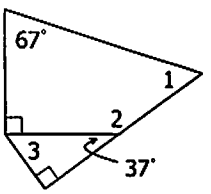
$x^2+9^2=36^2$

$x^2=1215$

$x=34.9\text{ ft}$

Topic #4: Quadrilaterals

28. Find each angle measure.



$m\angle 1 =$ 60°

$m\angle 2 =$ 143°

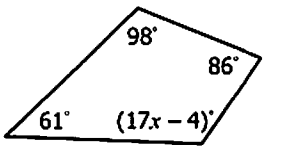
$m\angle 3 =$ 53°

29. Solve for x.

$17x-4=115$

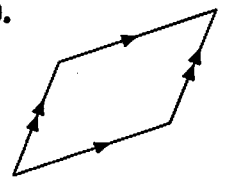
$17x=119$

$x=7$



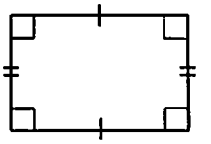
Classify each figure using all names that apply.

30.



- ☑ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☑ Parallelogram
- ☐ Rectangle
- ☐ Rhombus
- ☐ Square

31.



- ☑ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☑ Parallelogram
- ☑ Rectangle
- ☐ Rhombus
- ☐ Square

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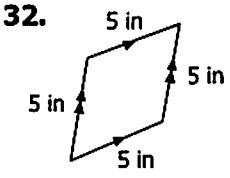
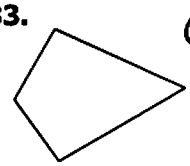
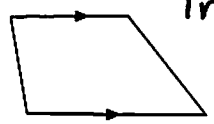
Classify each figure using the name that best describes it.

32. 

Rhombus

33. 
Quadrilateral

34. 
Trapezoid

Determine if the statement is always, sometimes, or never true.

35. A rectangle is a square.
Sometimes

36. A quadrilateral is a parallelogram.
sometimes

37. An trapezoid is a rhombus.
never

38. A square is a rhombus.
always

Topic #5: Polygons

Formula for the sum of the measures of the interior angles of polygon:

$(n-2)\cdot 180$

$n =$ # of sides

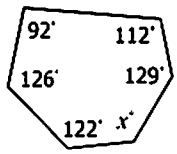
39. Find the sum of the measures of the interior angles of each polygon.

a) heptagon (7-sides)
$(7-2)\cdot 180$
$5\cdot 180$
$= 900°$

b) 16-gon
$(16-2)\cdot 180$
$= 2520°$

c) 35-gon
$(35-2)\cdot 180$
$= 5940°$

40. Find the measure of the missing angle.
(Sum to 720°)



$x = 139°$

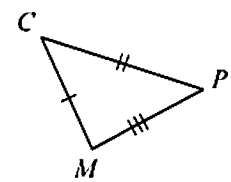
41. A nonagon has interior angles that measure 121°, 155°, 146°, 139°, 140°, 159°, 134°, and 148°. Find the measure of the remaining angle.
(Sum to 1260°)

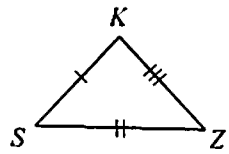
$x = 118°$

42. If parallelogram $PQRS \cong$ parallelogram $TUVW$, identify the congruent parts.

$\angle P \cong \angle T$	$\overline{TU} \cong \overline{PQ}$
$\angle Q \cong \angle U$	$\overline{VW} \cong \overline{RS}$
$\angle R \cong \angle V$	$\overline{TW} \cong \overline{PS}$
$\angle S \cong \angle W$	$\overline{UV} \cong \overline{QR}$

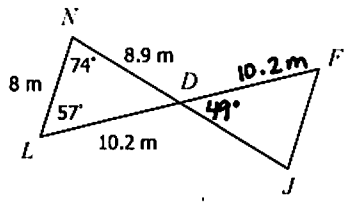
43. If the triangles below are congruent, write a valid congruency statement.





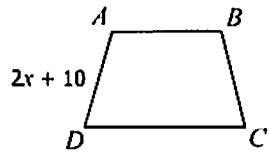
$\triangle MCP \cong \triangle KSZ$

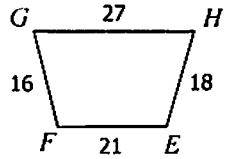
44. If $\triangle LND \cong \triangle FJD$, find each measure.



$m\angle FDJ = 49°$	$DF = 10.2\,m$
$m\angle F = 57°$	$FJ = 8\,m$
$m\angle J = 74°$	$DJ = 8.9\,m$

45. If trapezoid $ABCD \cong$ trapezoid $EFGH$, find the value of x.





$2x+10 = 18$
$2x = 8$
$x = 4$

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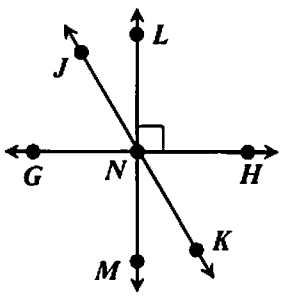
Pre-Algebra Review

QUIZ 7

Name: _____

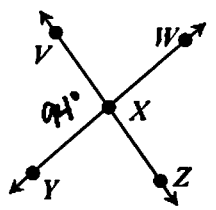
Date: _____ **Per:** _____

1. Which of the following describes $\angle JNL$ and $\angle MNK$? Check all that apply.



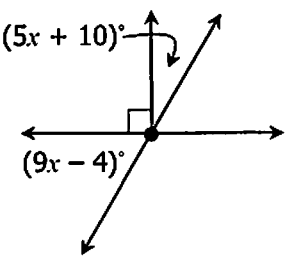
- ☑ Vertical
- ☐ Adjacent
- ☐ Complementary
- ☐ Supplementary
- ☐ Congruent

2. If $m\angle VXY = 94°$, find the measure of $\angle YXZ$. Write your answer in the box.



86°

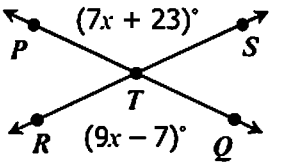
3. Find the value of x.



A. 3.5
B. 6
C. 8
D. 12.5

$9x-4+90+5x+10=180$
$14x+96=180$
$14x=84$
$x=6$

4. Find $m\angle STQ$.



A. 52°
B. 64°
C. 116°
D. 128°

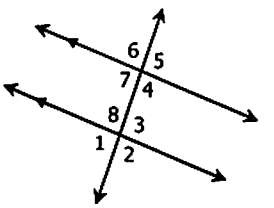
$9x-7=7x+23$
$2x=30$
$x=15$
$7(15)+23=128°$

5. If $\angle A$ is complementary to $\angle B$, $\angle B$ is supplementary to $\angle C$, and $m\angle A = 59°$, find $m\angle C$.

$A=59°,\ B=31°,\ C=149°$

A. 31°
B. 109°
C. 121°
D. 149°

6. Given the diagram below, name a pair of corresponding angles. Write your answers in the boxes.



∠6 and ∠8

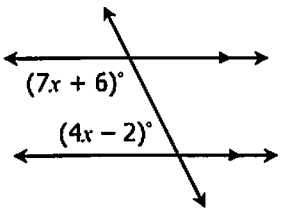
(7+1, 5+3, 4+2)

7. Using the diagram above, if $m\angle 4 = 82°$, which of the following describes the relationship between angles 4 and 8, and gives the measure of $\angle 8$?

A. Alternate Interior Angles; $m\angle 8 = 82°$
B. Alternate Interior Angles; $m\angle 8 = 98°$
C. Consecutive Interior Angles; $m\angle 8 = 82°$
D. Consecutive Interior Angles; $m\angle 8 = 98°$

8. Find the value of x. Write your answer in the box.

$7x+6+4x-2=180$
$11x+4=180$
$11x=176$
$x=16$



$x = 16$

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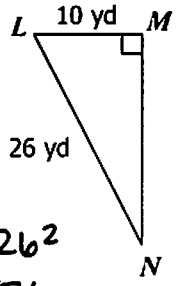
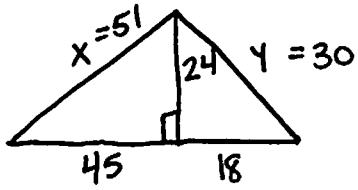
9. What is the length of $\overline{MN}$?



A. 16 yd
B. 22 yd
C. 24 yd
D. 36 yd

$10^2 + x^2 = 26^2$
$x^2 = 576$
$x = 24$

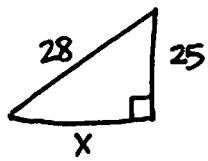
10. Starting from a tree, Cole and Logan run 24 feet south. Then, Cole runs 18 feet east while Logan runs 45 feet west, then they both stop. How many feet closer to the tree is Cole than Logan?



A. 18 ft
B. 21 ft
C. 27 ft
D. 30 ft

$51 - 30 = 21$

11. A fireman has a 28-foot ladder. In order to reach a point 25 feet up a building, about how far away from the building should he place the bottom of the ladder?



A. 10.9 ft
B. 11.2 ft
C. 11.8 ft
D. 12.6 ft

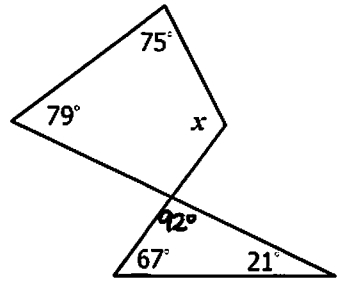
$x^2 + 25^2 = 28^2$
$x^2 = 159$
$x = 12.6$

12. Given the side lengths of three triangles below, determine which statement is true.

Triangle A	20 cm, 21 cm, 29 cm
Triangle B	12 cm, 18 cm, 30 cm
Triangle C	9 cm, 40 cm, 41 cm

A. Triangles A and B are right triangles.
B. Triangles A and C are right triangles.
C. Triangles B and C are right triangles.
D. Triangles A, B, and C are right triangles.

13. Find $m\angle x$.



A. 114°
B. 118°
C. 121°
D. 123°

14. Which of the following statements describe a rhombus? Check all that apply.

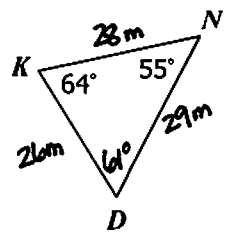
- ☐ It has four congruent angles.
- ☑ It has four congruent sides.
- ☐ It is always a square.
- ☐ It is sometimes a quadrilateral.
- ☑ It is always a parallelogram.
- ☑ It is sometimes a rectangle.

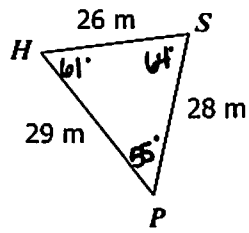
15. If a polygon has 14 sides, find the sum of the measures of its interior angles. Write your answer in the box.

$(14-2) \cdot 180$
$12 \cdot 180$

2160°

16. If $\Delta KND \cong \Delta SPH$, which correctly give the measure of $\angle H$ and the length of $\overline{KN}$?





A. $m\angle H = 64°$; $KN = 29$ m .
B. $m\angle H = 61°$; $KN = 29$ m
C. $m\angle H = 64°$; $KN = 28$ m
D. $m\angle H = 61°$; $KN = 28$ m

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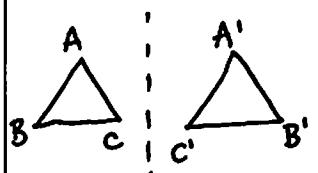
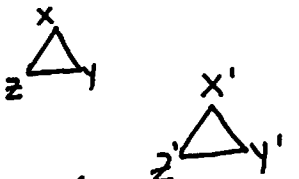
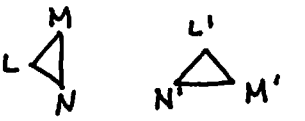
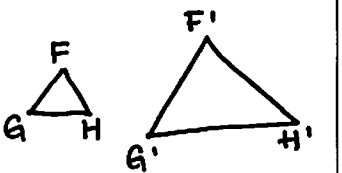
Name: _____ **Pre-Algebra Review:** Packet #8

Topic #1: Transformations

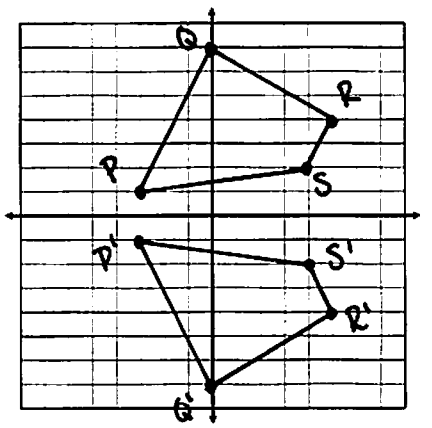
For each transformation, describe what it is and draw a picture as a visual.

REFLECTION	TRANSLATION	ROTATION	DILATION
 (Flip)	 (Slide)	 (Turn)	 (Enlarge / Reduce)

Topic #2: Reflections

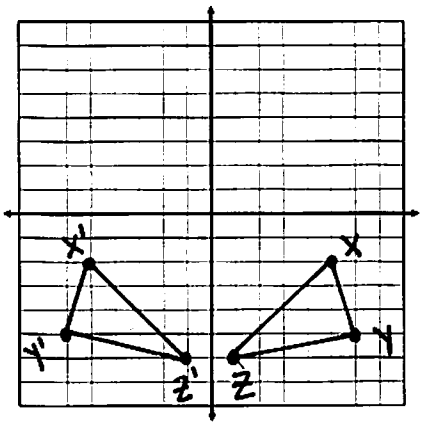
Graph and label each figure and its image under the reflection in the given line. Then, give the new coordinates.

1. Trapezoid $PQRS$ with vertices $P(-3, 1)$, $Q(0, 7)$, $R(5, 4)$, and $S(4, 2)$; **x-axis**



P' (-3, -1)
Q' (0, -7)
R' (5, -4)
S' (4, -2)

2. Triangle XYZ with vertices $X(5, -2)$, $Y(6, -5)$, and $Z(1, -6)$; **y-axis**

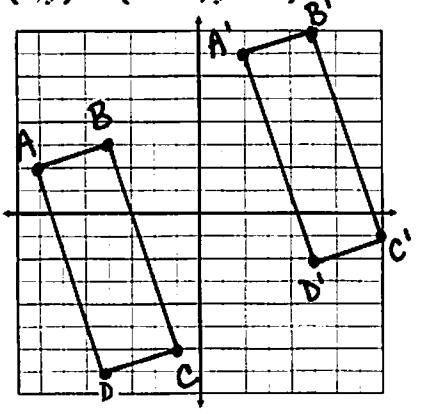


X' (-5, -2)
Y' (-6, -5)
Z' (-1, -6)

Topic #3: Translations

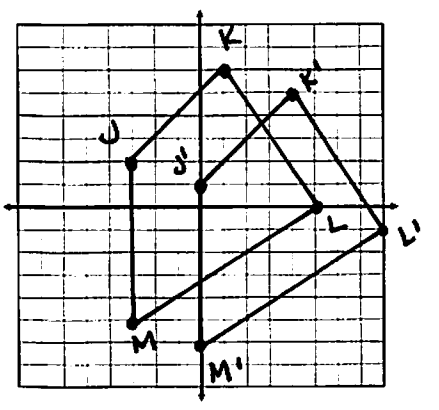
Graph and label each figure and its image under the given translation rule. Then, give the new coordinates.

3. Rectangle $ABCD$ with vertices $A(-7, 2)$, $B(-4, 3)$, $C(-1, -6)$, and $D(-4, -7)$; translated along the rule **$(x, y) \rightarrow (x + 9, y + 5)$**



A' (2, 7)
B' (5, 8)
C' (8, -1)
D' (5, -2)

4. Quadrilateral $JKLM$ with vertices $J(-3, 2)$, $K(1, 6)$, $L(5, 0)$, and $M(-3, -5)$; translated along the rule **$(x, y) \rightarrow (x + 3, y - 1)$**



J' (0, 1)
K' (4, 5)
L' (8, -1)
M' (0, -6)

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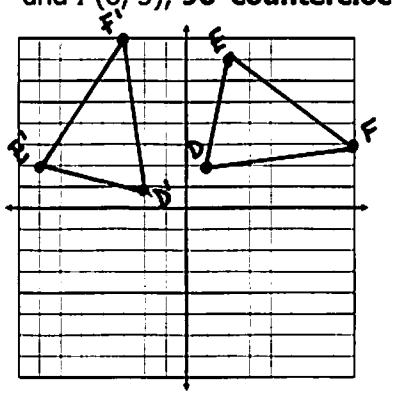
Topic #4: Translations

Complete each rule for counterclockwise rotations about the origin.

90°	180°	270°
$(x, y) \rightarrow$ (-y, x)	$(x, y) \rightarrow$ (-x, -y)	$(x, y) \rightarrow$ (y, -x)

Graph and label each figure and its image under the given rotation. Then, give the new coordinates. Assume all rotations are about the origin.

5. Triangle DEF with vertices $D(1, 2)$, $E(2, 7)$, and $F(8, 3)$; **90° counterclockwise rotation**

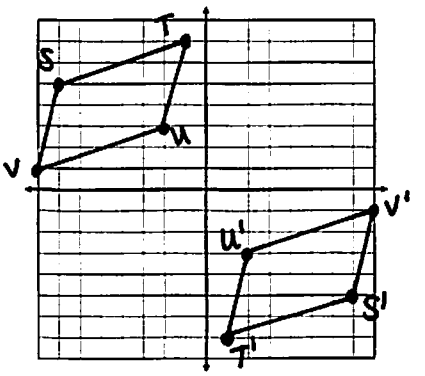


D' (-2, 1)

E' (-7, 2)

F' (-3, 8)

6. Parallelogram $STUV$ with vertices $S(-7, 5)$, $T(-1, 7)$, $U(-2, 3)$, and $V(-8, 1)$; **180° rotation**



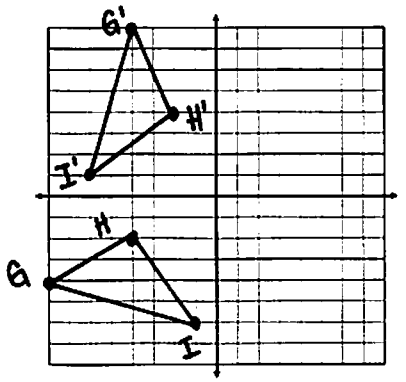
S' (7, -5)

T' (1, -7)

U' (2, -3)

V' (8, -1)

7. Triangle GHI with vertices $G(-8, -4)$, $H(-4, -2)$, and $I(-1, -6)$; **270° counterclockwise rotation**

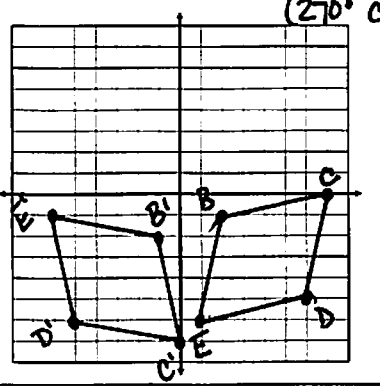


G' (-4, 8)

H' (-2, 4)

I' (-6, 1)

8. Rhombus $BCDE$ with vertices $B(2, -1)$, $C(7, 0)$, $D(6, -5)$, and $E(1, -6)$; **90° clockwise rotation** (270° CCW)



B' (-1, -2)

C' (0, -7)

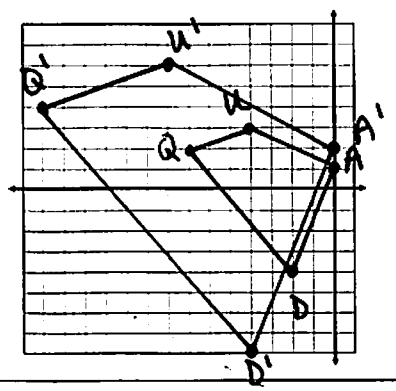
D' (-5, -6)

E' (-6, -1)

Topic #5: Dilations

Graph and label each figure and its image under the dilation with the given scale factor, k. Then, give the new coordinates.

9. Quadrilateral $QUAD$ with vertices $Q(-7, 2)$, $U(-4, 3)$, $A(0, 1)$, and $D(-2, -4)$; k = **2**



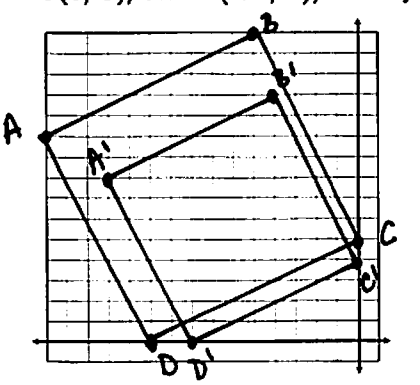
Q' (-14, 4)

U' (-8, 6)

A' (0, 2)

D' (-4, -8)

10. Square $ABCD$ with vertices $A(-15, 10)$, $B(-5, 15)$, $C(0, 5)$, and $D(-10, 0)$; k = **4/5**



A' (-12, 8)

B' (-4, 12)

C' (0, 4)

D' (-8, 0)

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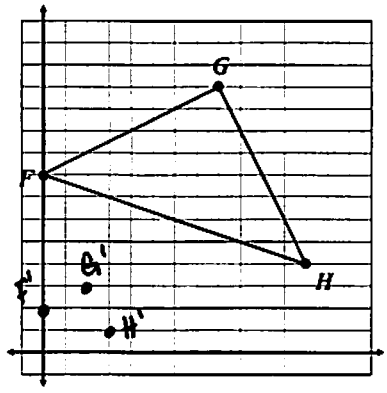
11. Graph the image of the triangle below using a scale factor of $k = 1/4$.

F(0,8)
G (8,12)
H (12,4)



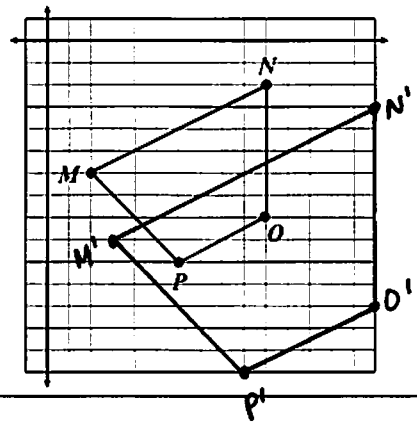
F'(0 , 2)

G'(2 , 3)

H'(3 , 1)

12. Graph the image of the trapezoid below using a scale factor of $k = 3/2$.

M (2,-6)
N (10,-2)
O (10,-8)
P (6,-10)



M'(3 , -9)

N'(15 , -3)

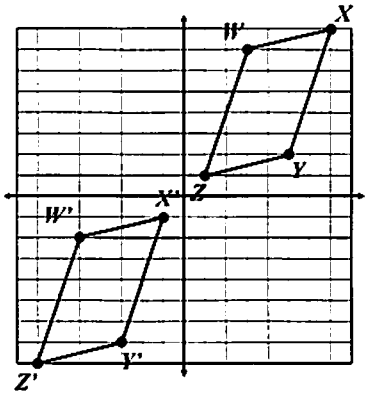
O'(15 , -12)

P'(9 , -15)

Topic #6: Identifying Transformations and Writing Rules

Determine the type of transformation and write a rule.

13.

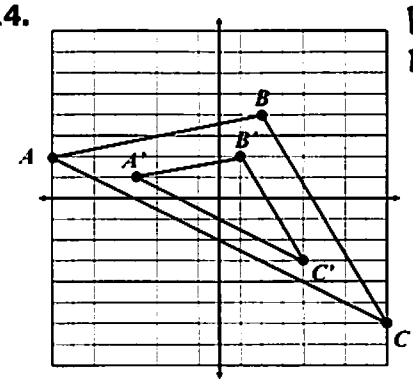


Translation

$(x,y) \rightarrow (x-8, y-9)$

14.

B(2,4)
B'(1,2)

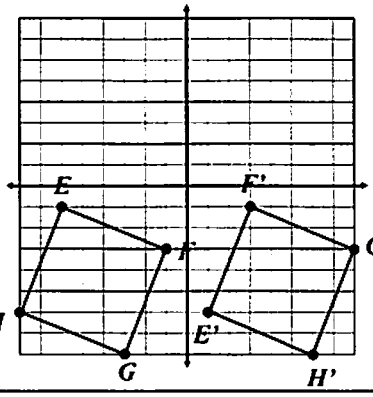


Dilation

$K = \frac{1}{2}$

15.

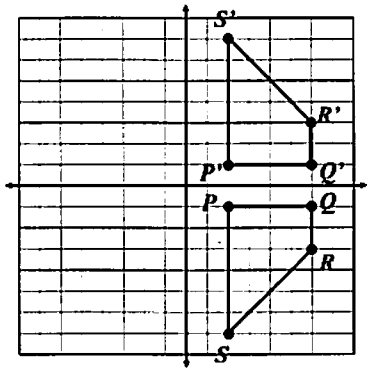
F (-1,-3)
F'(3,-1)



Rotation

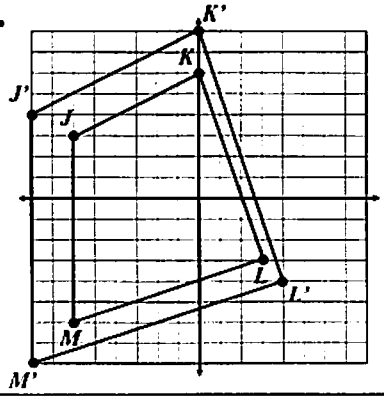
90° ccw

16.



Reflection across X-axis

17.

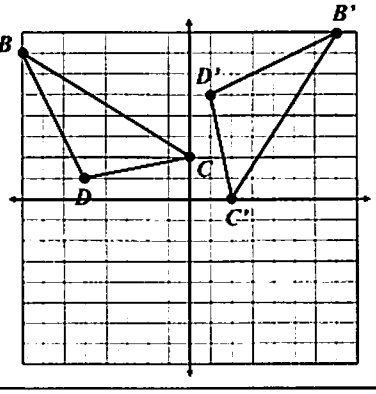


K (0,6)
K'(0,8)

Dilation

$K = \frac{4}{3}$

18.



B(-8,7)
B'(7,8)

Rotation

270° ccw

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Pre-Algebra Review

QUIZ 8

Name: _____

Date: _____ **Per:** _____

1. If ΔLMN with vertices $L(-7, -2)$, $M(-1, -5)$, and $N(-6, -8)$ is reflected along the y-axis, what will be the coordinates of $L'M'N'$?

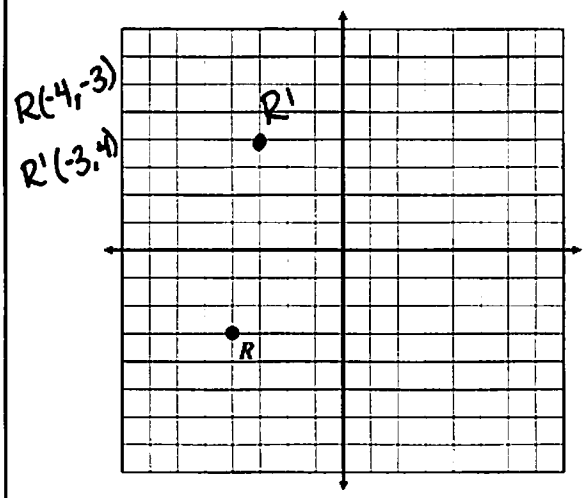
A. $L'(-7, 2)$, $M'(-1, 5)$, $N'(-6, 8)$

B. $L'(7, -2)$, $M'(1, -5)$, $N'(6, -8)$

C. $L'(7, 2)$, $M'(1, 5)$, $N'(6, 8)$

D. $L'(-2, -7)$, $M'(-5, -1)$, $N'(-8, -6)$

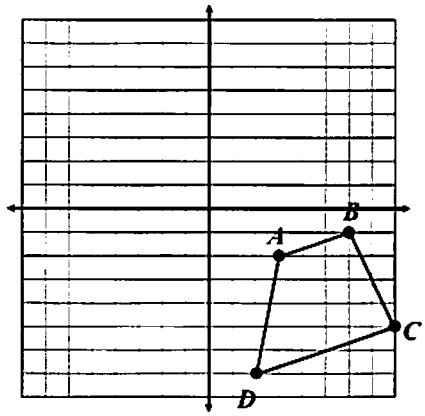
2. If point R shown below is rotated 270° counterclockwise about the origin, what will be the coordinates of R'? Give your answer by plotting the point on the grid.



3. Which transformations result in congruent figures? Check all that apply.

☑ Reflections	☑ Rotations
☑ Translations	☐ Dilations

4. Trapezoid $ABCD$ is shown below. Which transformation will result in an image that lies completely within the first quadrant? Check all that apply. Assume all rotations are about the origin.



- ☑ A reflection in the x-axis.
- ☐ A reflection in the y-axis.
- ☑ A 90° counterclockwise rotation.
- ☐ A 180° rotation.
- ☑ A 270° clockwise rotation.
- ☑ Translation along the rule $(x, y) \rightarrow (x - 1, y + 9)$.

5. If ΔWXY with vertices $W(4, 2)$, $X(6, 10)$, and $Y(8, 4)$ is dilated using a scale factor of 2, what will be the coordinates of $W'X'Y'$?

A. $W'(2, 1)$, $X'(3, 5)$, $Y'(4, 2)$

B. $W'(6, 4)$, $X'(8, 12)$, $Y'(10, 6)$

C. $W'(8, 4)$, $X'(12, 20)$, $Y'(16, 8)$

D. $W'(8, 2)$, $X'(16, 10)$, $Y'(16, 4)$

6. Which pair of points represent a 180° degree rotation around the origin?

A. $A'(2, 6)$ and $A'(-6, -2)$

B. $B'(-1, -3)$ and $B'(3, -1)$

C. $C'(-4, -5)$ and $C'(-5, 4)$

D. $D'(7, -2)$ and $D'(-7, 2)$

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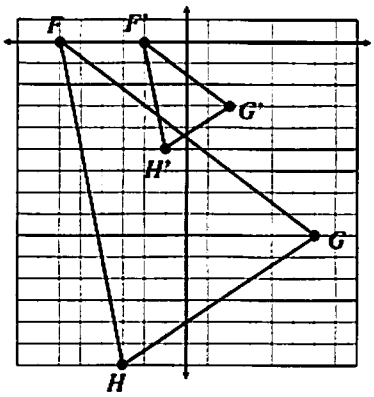
7. Identify the scale factor that was used to graph $\Delta F'G'H$.

F(-6,0)
F'(-2,0)



A. 3

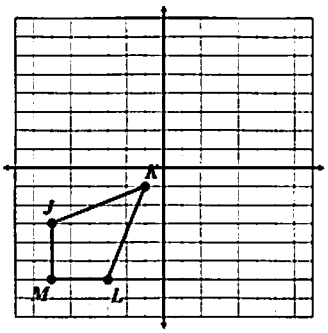
B. 4

C. $\frac{1}{3}$

D. $\frac{1}{4}$

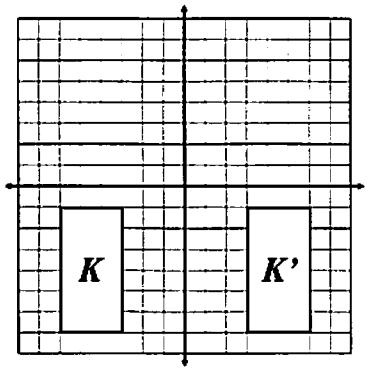
8. If the figure below is reflected in the x-axis, then translated along the rule $(x, y) \rightarrow (x + 1, y - 2)$, what will be the coordinates of the point J'? Write the coordinates in the boxes.

J(-6,-3)



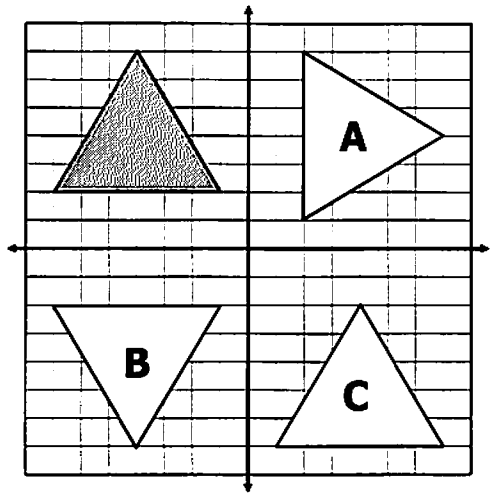
([-5] , [-5])

9. Which transformations could move rectangle K to rectangle K' in one single step? Check all that apply.



- ☐ A reflection in the x-axis.
- ☑ A reflection in the y-axis.
- ☐ A rotation about the origin.
- ☑ A translation.

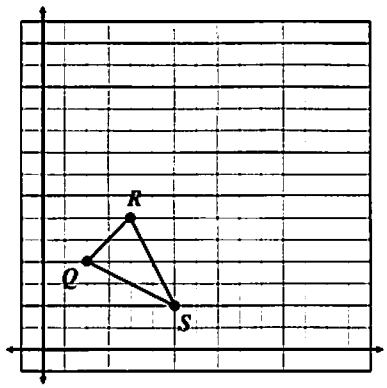
10. Which triangles show a translation of the shaded triangle? Check all that apply.



☐ Triangle A ☐ Triangle B ☑ Triangle C

11. If the triangle below is dilated using a scale factor of 5/2, what will be the coordinates of S'? Write the coordinates in the boxes.

S(6,2)



([15] , [5])

12. The coordinates of ΔTUV and its image after a transformation are given below. Identify the transformation.

ΔTUV	$T(-5, 4)$, $U(-1, 2)$, $V(0, -7)$
$\Delta T'U'V'$	$T'(4, 5)$, $U'(2, 1)$, $V'(-7, 0)$

A. A reflection in the x-axis.

B. A reflection in the y-axis.

C. A 90° counterclockwise rotation about the origin.

D. A 90° clockwise rotation about the origin. (270° ccw)

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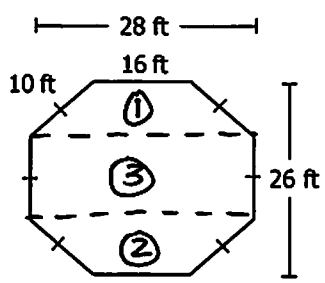
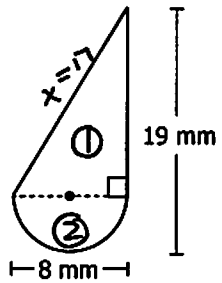
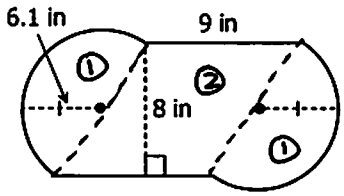
Name: _____ **Pre-Algebra Review:** Packet #9

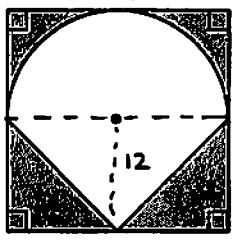
Topic #1: Perimeter & Area of Composite Figures

Find the perimeter and area of each composite figure. Round to the nearest tenth if necessary.

Figure	Perimeter	Area
1. 	$P = 2(16) + 6(10)$ $= 32 + 60$ $= \boxed{92 \text{ ft}}$	$A_1 = \frac{1}{2}(8)(16+28) = 176$ $A_2 = \frac{1}{2}(8)(16+28) = 176$ $A_3 = 28(10) = 280$ $A = 2(176) + 280 = \boxed{632 \text{ ft}^2}$
2. 	$8^2 + 15^2 = x^2$ $289 = x^2$ $x = 17$ $P = 17 + 15 + \frac{1}{2}(\pi \cdot 8)$ $= 32 + \frac{1}{2}(25.1)$ $= \boxed{44.6 \text{ mm}}$	$A_1 = \frac{1}{2}(8)(15) = 60$ $A_2 = \frac{1}{2}\pi(4)^2 = 25.1$ $A = 60 + 25.1 = \boxed{85.1 \text{ mm}^2}$
3. 	$P = 2(9) + 2\pi(6.1)$ $= 18 + 38.3$ $= \boxed{56.3 \text{ in}}$	$A_1 = \pi(6.1)^2 = 116.9$ $A_2 = 9(8) = 72$ $A = 116.9 + 72 = \boxed{188.9 \text{ in}^2}$

Topic #2: Area of Shaded Regions

Find the area of the shaded region. Round to the nearest tenth if necessary.

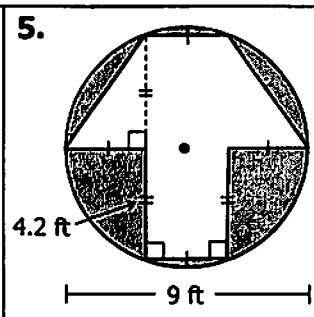
4. 

$A_{\square} = 24^2 = 576$

$A_{\triangle} = \frac{1}{2}\pi(12)^2$
$= 226.2$

$A_{\triangle} = \frac{1}{2}(24)(12)$
$= 144$

$A = 576 - 226.2 - 144$
$= \boxed{205.8 \text{ cm}^2}$

5. 

$A_{D} = \pi(4.5)^2$
$= 63.6$

$A_{\triangle} = \frac{1}{2}(4.2)(3+9)$
$= 25.2$

$A_{\square} = 4.2(3)$
$= 12.6$

$A = 63.6 - 25.2 - 12.6 = \boxed{25.8 \text{ ft}^2}$

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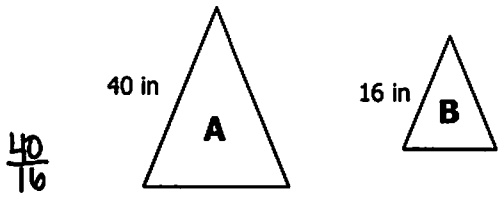
Topic #3: Area & Perimeter of Similar Figures

Assume each pair of figures below are similar.

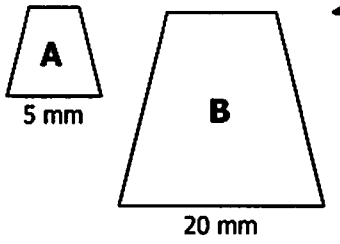
6. Give the scale factor, perimeter ratio, and area ratio of Figure A to Figure B.



$\frac{40}{16}$

Scale Factor	Perimeter Ratio	Area Ratio
5:2	5:2	25:4

7. If the perimeter of Figure B is 84 millimeters, find the perimeter of Figure A.



$\frac{5}{20} = \frac{1}{4}$

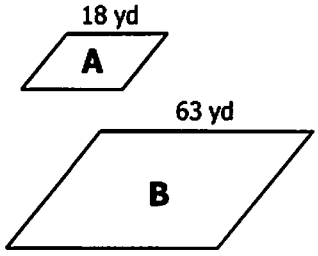
$\frac{1}{4} = \frac{x}{84}$

$4x = 84$

$x = 21$ mm

8. If the area of Figure A is 216 square yards, find the area of Figure B.

$\frac{18}{63} = \frac{2}{7}$



$\frac{4}{49} = \frac{216}{x}$

$4x = 10584$

$x = 2646\ yd^2$

9. The area of Triangle A is 128 m^2 and the area of Triangle B is 72 m^2. If the triangles are similar and the height of Triangle B is 20 m, find the height of Triangle A.

$\frac{128}{72} = \frac{16}{9}$

$\frac{4}{3} = \frac{x}{20}$

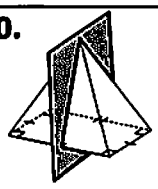
$3x = 80$

$x \approx 26.7$ m

Topic #4: 3D Figures & Cross Sections

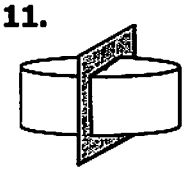
Draw and describe the cross section that results from each slice.

10.



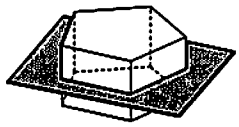
Triangle

11.



Rectangle

12.



Pentagon

Topic #5: Volume & Surface Area of 3D Figures

Find the volume and surface area of each solid. Round to the nearest tenth if necessary.

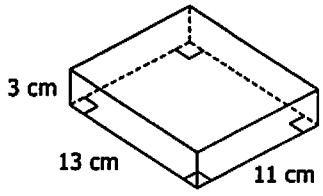
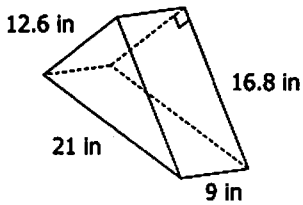
Figure	Volume	Surface Area
13. 	$V = 3(13)(11)$ $= 429\ cm^3$	$SA = 2(3)(13) + 2(3)(11) + 2(11)(13)$ $= 78 + 66 + 286$ $= 430\ cm^2$
14. 	$B = \frac{1}{2}(12.6)(16.8)$ $= 105.84$ $V = 105.84(9)$ $= 952.6\ in^3$	$SA = 9(50.4) + 2(105.84)$ $= 453.6 + 211.68$ $= 665.3\ in^2$

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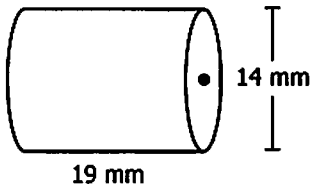
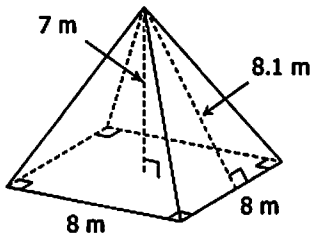
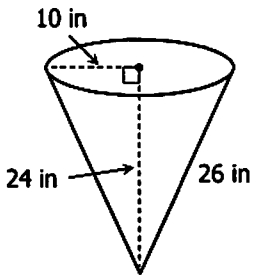
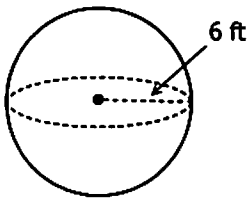
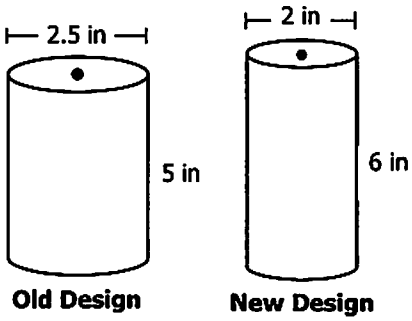
Figure	Volume	Surface Area
15. 	$V = \pi(7)^2(19)$ $= \boxed{2924.8\ mm^3}$	$SA = 2\pi(7)^2 + 2\pi(7)(19)$ $= \boxed{1143.5\ mm^2}$
16. 	$B = 8^2 = 64$ $V = \frac{1}{3}(64)(7)$ $= \boxed{149.3\ m3}$	$SA = \frac{1}{2}(8.1)(32) + 64$ $= \boxed{193.6\ m^2}$
17. 	$V = \frac{1}{3}\pi(10)^2(24)$ $= \boxed{2513.3\ in3}$	$SA = \pi(10)^2 + \pi(10)(26)$ $= \boxed{1131\ in^2}$
18. 	$V = \frac{4}{3}\pi(6)^3$ $= \boxed{904.8\ ft^3}$	$SA = 4\pi(6)^2$ $= \boxed{452.4\ ft^2}$

Topic #6: Volume & Surface Area Applications

19. A certain soda currently comes in the can on the left. To save on aluminum, the company that makes the soda is considering switching to the can on the right. How much aluminum will they save per can?



$SA_{old} = 2\pi(1.25)^2 + 2\pi(1.25)(5)$
$= 49.1\ in^2$

$SA_{new} = 2\pi(1)^2 + 2\pi(1)(6)$
$= 44\ in^2$

$49.1 - 44 = \boxed{5.1\ in^2}$

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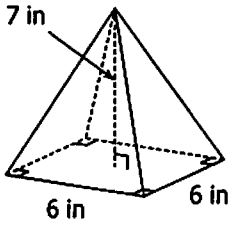
20. A wax candle is made in the shape of a square base pyramid with dimensions shown below. If the wax burns at a rate of four cubic inches every five hours, how many hours will the candle last?



$B = 6^2 = 36$

$V = \frac{1}{3}(36)(7) = 84 \text{ in}^3$

$\frac{4}{5} = \frac{x}{84}$

$5x = 336$

$x = 67.2$ hrs

21. If a cone with a height of 12 meters has a volume of 314.16 cubic meters, find the diameter of the cone.

$V = \frac{1}{3}\pi r^2 h$

$314.16 = \frac{1}{3}\pi r^2 (12)$

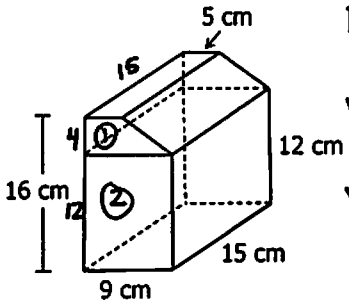
$314.16 = 4\pi r^2$

$25 = r^2$

$5 = r$

$d = 10$ m

22. Find the total volume of the figure below.



$B_1 = \frac{1}{2}(4)(5+9) = 28$

$V_1 = 28(15) = 420$

$V_2 = 9(15)(12) = 1620$

$V = 420 + 1620 = 2040 \text{ cm}^3$

23. If the height of a cylinder is multiplied by four, how will it affect its volume?

$r=1, h=1$ $\quad V = \pi(1)^2(1) = 1\pi$

$r=1, h=4$ $\quad V = \pi(1)^2(4) = 4\pi$

4 times as large

24. If the radius of a cylinder is multiplied by 1/4, how will it affect its volume?

$r=4, h=1$ $\quad V = \pi(4)^2(1) = 16\pi$

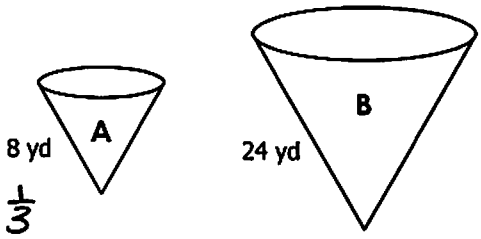
$r=1, h=1$ $\quad V = \pi(1)^2(1) = 1\pi$

1/16th as large

Topic #7: Volume & Surface Area of Similar Solids

Assuming each pair of solids are similar, give the scale factor, surface area ratio, and volume ratio of Solid A to Solid B.

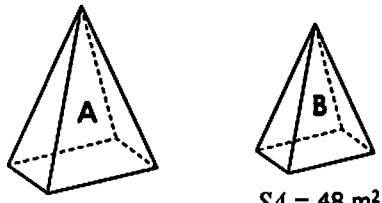
25.



$\frac{8}{24} = \frac{1}{3}$

Scale Factor	Surface Area Ratio	Volume Ratio
1:3	1:9	1:27

26.



$\frac{75}{48} = \frac{25}{16}$

Scale Factor	Surface Area Ratio	Volume Ratio
5:4	25:16	125:64

27. The volume of Cylinder A is 189 ft³ and the volume of Cylinder B is 56 ft³. If the cylinders are similar, what is the ratio of surface area of Cylinder A to the surface area of Cylinder B?

$\frac{189}{56} = \frac{27}{8} \quad \frac{(a^3)}{(b^3)} \rightarrow \frac{3}{2} \quad \frac{(a)}{(b)}$

$SA = \frac{9}{4}$

28. The surface area of Prism A is 60 cm² and the surface area of Prism B is 735 cm². If the prisms are similar and the height of Prism B is 28 cm, find the height of Prism B.

$\frac{60}{735} = \frac{4}{49} \quad \frac{(a^2)}{(b^2)} \rightarrow \frac{2}{7} \quad \frac{(a)}{(b)}$

$\frac{2}{7} = \frac{x}{28}$

$7x = 56$

$x = 8$ cm

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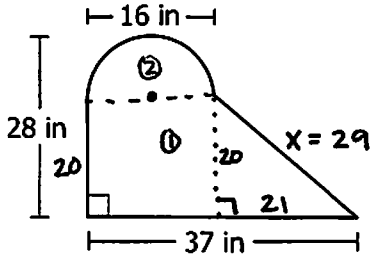
Pre-Algebra Review

QUIZ 9

Name: _____

Date: _____ **Per:** _____

Use the figure below for questions 1 and 2.



1. Find the area of the figure to the nearest tenth of a square inch.

$A_1 = \frac{1}{2}(20)(16+37)$

$= 530$

$A_2 = \frac{1}{2}\pi(8)^2$

$= 100.5$

(A.) 630.5 in²
B. 731.1 in²
C. 930.1 in²
D. 1,334.2 in²

2. Find the perimeter of the figure to the nearest tenth of an inch.

$20^2 + 21^2 = x^2$

$841 = x^2$

$x = 29$

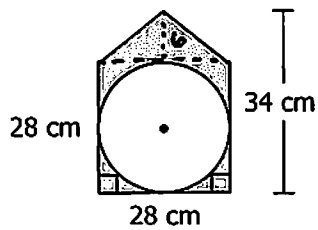
$20 + 37 + 29 + \frac{1}{2}\pi(16)$

A. 116.8 in
B. 97.1 in
(C.) 111.1 in
D. 136.3 in

3. Find the area of the shaded region to the nearest tenth of a centimeter.

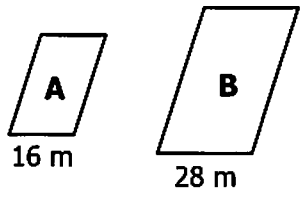
$A_{out\ \Delta} = 28^2 + \frac{1}{2}(6)(28) = 868$

$A_{in\ O} = \pi(14)^2 = 615.8$



A. 220.4 cm²
(B.) 252.2 cm²
C. 264.8 cm²
D. 279.1 cm²

4. The parallelograms below are similar. Give the ratio of the area of Parallelogram A to the area of Parallelogram B in simplest form. Write your answer in the boxes.



$\frac{16}{28} = \frac{4}{7}$

16 : 49

5. The area of Triangle A is 261 feet and the area of Triangle B is 116 feet. If the perimeter of Triangle B is 32 square feet, find the perimeter of Triangle A.

$\frac{261}{116} = \frac{9}{4}\ (a^2)\ (b^2)$

$\frac{3}{2} = \frac{x}{32}$

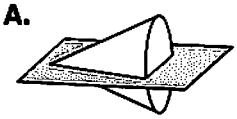
$2x = 96$

$x = 48$

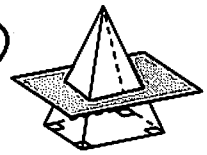
A. 39 ft
B. 42 ft
C. 45 ft
(D.) 48 ft

6. Which shape does not have a triangular cross section?

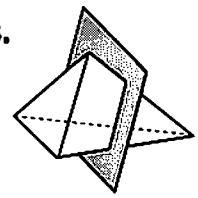
A.



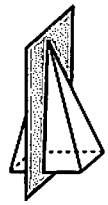
(C.)



B.

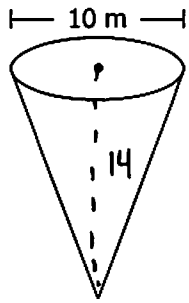


D.



7. If the height of the cone shown below is one less than three times its radius, find the volume of the cone to the nearest cubic meter.

$V = \frac{1}{3}\pi(5)^2(14)$



A. 324.1 m³
(B.) 366.5 m²
C. 1,794.2 m²
D. 3,036.9 m²

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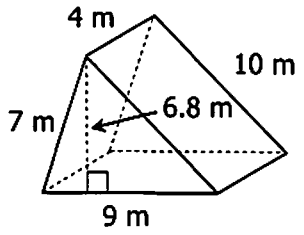
8. Find the surface area of the figure below.



$B = \frac{1}{2}(6.8)(9)$

$= 30.6$

$SA = 4(26) + 2(30.6)$

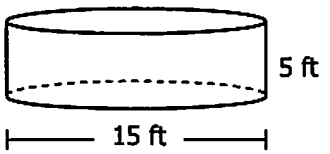
A. 149.5 m²
B. 154.8 m²
C. 165.2 m²
D. 171.9 m²

9. Find the volume of a sphere with a radius of 12 inches to the nearest tenth of a cubic inch.

$V = \frac{4}{3}\pi(12)^3$

A. 603.2 in³
B. 904.8 in³
C. 1,583.2 in³
D. 7,238.2 in³

10. Find the surface area of the cylinder below to the nearest tenth of a square foot.



$SA = 2\pi(7.5)^2 + 2\pi(7.5)(15)$

A. 589.0 ft²
B. 610.4 ft²
C. 790.8 ft²
D. 1,885.0 ft²

11. A sandbox in the shape of a rectangular prism is 7 feet long, 5 feet wide, and 1 foot tall. If six inches is added to the height, how much more sand can it hold?

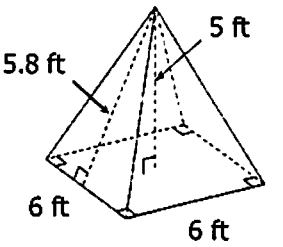
$V = 7(5)(1) = 35$

$V = 7(5)(1.5) = 52.5$

$52.5 - 35$

A. 12 ft³
B. 15 ft³
C. 17.5 ft³
D. 21 ft³

12. Randy is making a hollow square base pyramid out of wood to be used as a prop in a musical. If he has 200 square feet of wood available, how much material will he have left after constructing the pyramid?



$SA = \frac{1}{2}(5.8)(24) + 36$

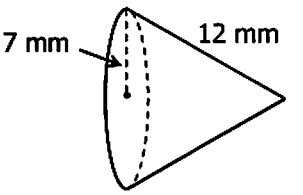
$= 105.6$

$200 - 105.6$

$=$

A. 130.4 ft²
B. 140 ft²
C. 104 ft²
D. 94.4 ft²

13. Find the surface area the cone below to the nearest tenth of a square millimeter.



$SA = \pi(7)^2 + \pi(7)(12)$

A. 396.4 mm²
B. 417.8 mm²
C. 452.3 mm²
D. 481.7 mm²

14. The radius of a cylinder is 2 feet. How will the volume of the cylinder be affected if 4 feet is added to the radius? $r=2, h=1$

A. The volume will multiply by 2.
B. The volume will multiply by 3.
C. The volume will multiply by 8.
D. The volume will multiply by 9.

$V = \pi(2)^2(1) = 4\pi$

$r=6, h=1$

$V = \pi(6)^2(1) = 36\pi$

15. Pyramid A is similar to Pyramid B. If the ratio of their volumes is 64:1, what is the ratio of the height of Pyramid A to the height of Pyramid B?

$\frac{64}{1}\ \frac{(a^3)}{(b^3)} \rightarrow \frac{4}{1}$

A. 2:1
B. 4:1
C. 8:1
D. 16:1

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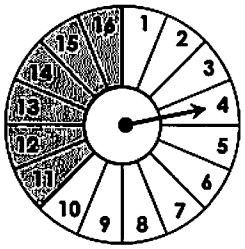
Name: _____ **Pre-Algebra Review:** Packet #10

Topic #1: Theoretical & Experimental Probability

1. If the spinner below is spun once, find each probability. Give each answer as a fraction in simplest form.



a) $P(12)$

$\frac{1}{16}$

b) P(greater than 7)

$\frac{9}{16}$

c) P(shaded)

$\frac{6}{16} = \frac{3}{8}$

d) P(prime number or multiple of 4)

2, 3, 5, 7, 11, 13 4, 8, 12, 16

$\frac{10}{16} = \frac{5}{8}$

2. The spinner above was spun 100 times. The results from the experiment are shown in the table below.

Result	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Frequency	8	4	7	10	5	7	4	9	8	6	5	7	3	8	6	3

a) Based on the experiment, what is the probability of spinning an even number? Compare this to the theoretical probability.

Exp: $\frac{54}{100} = \frac{27}{50}$ (54%)

Theo: $\frac{1}{2}$ (50%)

Experimental is higher than Theo.

b) Based on the experiment, what is the probability of spinning a number that is at most 12? Compare this to the theoretical probability.

Exp: $\frac{80}{100} = \frac{4}{5}$ (80%)

Theo: $\frac{12}{16} = \frac{3}{4}$ (75%)

Experimental is higher than Theo.

c) Theoretically, if the spinner is spun 250 times, how many times would you expect it to land on a number that is even and a perfect square?

(4, 16)

$\frac{2}{16} = \frac{x}{250}$ $16x = 500$

$x \approx 31$ times

d) Based on the experiment, if the spinner is spun 250 times, how many times would you expect it to land on a number that is even and a perfect square?

$\frac{13}{100} = \frac{x}{250}$ $100x = 3250$

$x \approx 33$ times

3. The table below shows the results of Tom's last four rounds (72 holes) of golf.

Result	Frequency
Bogie	16
Par	32
Birdie	18
Eagle	2
Hole-in-One	0
Other	4

a) Based on Tom's record, find the probability that he gets a birdie on his next hole.

$\frac{18}{72} = \frac{1}{4}$

b) If Tom plays 12 rounds (216 holes) of golf this summer, how many times would you expect him to par the hole?

$\frac{32}{72} = \frac{x}{216}$ $72x = 6912$

$x = 96$ pars

Topic #2: Counting Outcomes

4. Students who buy their lunch in the cafeteria can choose from a ham sandwich, a turkey sandwich, or a grilled cheese sandwich. For a side, they can choose fruit, yogurt, or a salad. For a drink, they can choose juice or milk. How many ways can they choose one sandwich, one side, and one drink?

$3 \cdot 3 \cdot 2 = 18$

5. How many raffle ticket numbers are possible if they contain two letters followed by three digits?

$26 \cdot 26 \cdot 10 \cdot 10 \cdot 10$

$= 676{,}000$

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6. If Sarah picks one card at random from a standard deck and then chooses one letter from the alphabet, how many outcomes are possible?

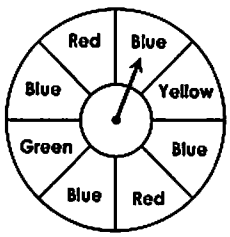
$52 \cdot 26 = \boxed{1352}$

7. Doug decided to guess on the last three multiple choice questions on his science test. If each question had four choices, how many ways can he answer the questions?

$4 \cdot 4 \cdot 4 = \boxed{64}$

Topic #3: Compound Probability

8. If the spinner below is spun twice, find each probability.



a) P(red, then green)

$\frac{2}{8} \cdot \frac{1}{8} = \frac{2}{64} = \boxed{\frac{1}{32}}$

b) P(yellow, then blue)

$\frac{1}{8} \cdot \frac{4}{8} = \frac{4}{64} = \boxed{\frac{1}{16}}$

c) P(blue both times)

$\frac{4}{8} \cdot \frac{4}{8} = \frac{16}{64} = \boxed{\frac{1}{4}}$

9. There are 13 girls and 15 boys in a math class. The teacher chooses a student at random, then rolls a standard die. Find the probability of choosing a boy then rolling a number that is at most 4.

$\frac{15}{28} \cdot \frac{4}{6} = \frac{60}{168} = \boxed{\frac{5}{14}}$

10. Karen is flying from Orlando to Baltimore, then Baltimore to Boston. The first flight has been delayed six times in the past fourteen days and the second flight has been delayed eight times in the past twelve days, what is the probability that both flights will be delayed on the day Karen flies?

$\frac{6}{14} \cdot \frac{8}{12} = \frac{48}{168} = \boxed{\frac{2}{7}}$

11. A piggy bank contains four pennies, six nickels, ten dimes, and five quarters. A coin is drawn at random, not replaced, then another is drawn. Find each probability.

a) P(nickel, then quarter)

$\frac{6}{25} \cdot \frac{5}{24} = \frac{30}{600} = \boxed{\frac{1}{20}}$

b) P(penny, then not a dime)

$\frac{4}{25} \cdot \frac{14}{24} = \frac{56}{600} = \boxed{\frac{7}{75}}$

c) P(both dimes)

$\frac{10}{25} \cdot \frac{9}{24} = \frac{90}{600} = \boxed{\frac{3}{20}}$

d) P(both nickels)

$\frac{6}{25} \cdot \frac{5}{24} = \frac{30}{600} = \boxed{\frac{1}{20}}$

Topic #4: Measures of Center, Range, Mean Absolute Deviation

Find the mean, median, mode, and range of each data set.

12. The distance, in yards, of each successful field goal attempt made by a kicker in his last practice: {42, 40, 36, 52, 43, 59, 45, 36, 52}

{36, 36, 40, 42, 43, 45, 52, 52, 59}

$\frac{405}{9}$

Mean	Median	Mode(s)	Range
45	43	36, 52	23

13. The number of minutes that Ed, a customer support specialist, has spent on his last twelve phone calls: {18, 5, 24, 20, 16, 7, 28, 35, 12, 24, 20, 43}

{5, 7, 12, 16, 18, 20, 20, 24, 24, 28, 35, 43}

$\frac{252}{12}$

Mean	Median	Mode(s)	Range
21	20	20, 24	38

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Find the mean absolute deviation of each data set. Round to the nearest tenth if necessary.

14. The number of grams of fat in eight different candy bars: {11, 14, 8, 7, 6, 11, 10, 13}

Mean = $\frac{80}{8} = 10$

MAD = $\frac{1+4+2+3+4+1+0+3}{8}$

= $\frac{18}{8}$ = $\boxed{2.25}$

15. The number of graduating seniors in years since 2012.

Year	Seniors
2012	379
2013	402
2014	388
2015	396
2016	410

Mean = $\frac{1975}{5} = 395$

MAD = $\frac{16+7+7+1+15}{5}$

= $\frac{46}{5}$ = $\boxed{9.2}$

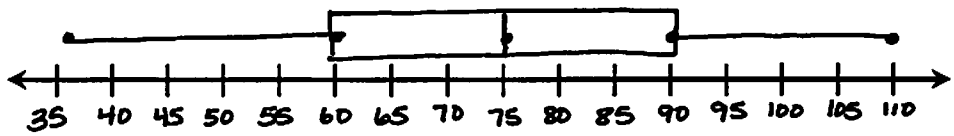
Topic #5: Box-and-Whisker Plots

Find the five-number summary and construct the box-and-whisker plot for each data set.

16. The mileage, in thousands of miles, of 10 cars in a used car lot: {54, 78, 110, 36, 68, 82, 60, 95, 90, 72}

36, 54, 60, 68, 72, 78, 82, 90, 95, 110

LQ, 75, UQ

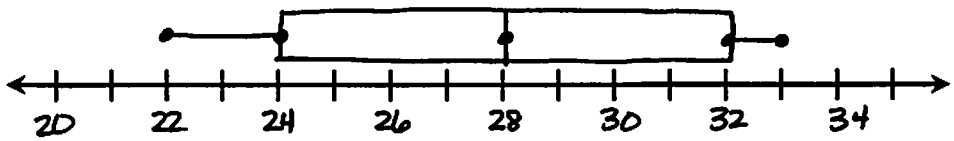


Minimum: 36
Lower Quartile: 60
Median: 75
Upper Quartile: 90
Maximum: 110

17. The ages of each player on a basketball team: {29, 33, 22, 27, 28, 28, 25, 32, 32, 29, 33, 25, 23, 24, 24}

22, 23, 24, 24, 25, 25, 27, 28, 28, 29, 29, 32, 32, 33, 33

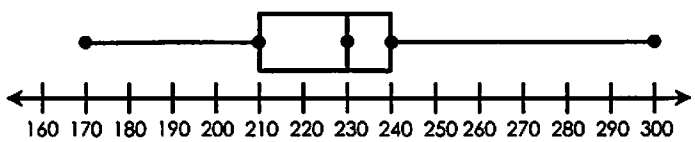
LQ, Med, UQ



Minimum: 22
Lower Quartile: 24
Median: 28
Upper Quartile: 32
Maximum: 33

18. Waterstone Crossing and Kingston Estates are two neighborhoods in the same city. Last year, 8 homes sold in Waterstone Crossing and 12 homes sold in Kingston Estates. Each home sold at a different price. The selling prices, in thousands of dollars, for each home are shown below.

Waterstone Crossing



Kingston Estates

a) Which neighborhood had a greater interquartile range in selling prices?

WC: 240 − 210 = 30

KE: 240 − 190 = 50

Kingston Estates

b) What is the difference in the median selling price between neighborhoods?

230 − 210 = 20

c) What percent of the homes in Waterstone Crossing sold for at least $240,000?

25%

d) How many homes in the two neighborhoods combined sold for more than $210,000?

WC: .75(8) = 6

KE: .50(12) = 6

12 homes

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Topic #6: Scatter Plots & Line of Best Fit

Determine whether the data would have a positive, negative, or no relationship.

19. A racers bib number in a marathon versus their finish time.

None

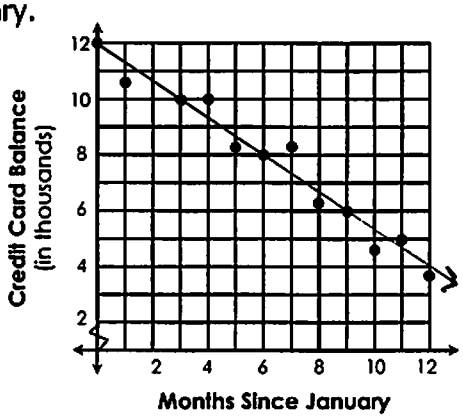
20. The number of passengers on a flight versus the number of suitcases checked.

Positive

21. The number of miles driven versus the amount of gas left in the tank.

Negative

22. Gavin's New Year's resolution was to pay off the balance on his credit card. The graph below shows the balance on the card each month since January.



a) Which line best represents this data?

A) $y=\frac{2}{3}x+12$

C) $y=-\frac{2}{3}x+12$

B) $y=\frac{3}{2}x+12$

D) $y=-\frac{3}{2}x+12$

b) Using the line of best fit from part a, predict the balance on Gavin's credit balance 15 months after January.

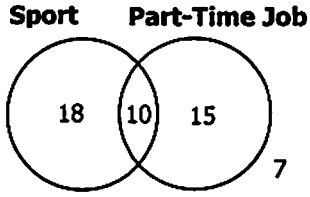
$y=-\frac{2}{3}(15)+12$

$=2$

$2000

Topic 7: Two-Way Tables

23. The Venn diagram below shows the results of a survey in which a group of students were asked if they play a sport or have a part-time job.



	Sport	No Sport	Total
Job	10	15	25
No Job	18	7	25
Total	28	22	50

24. The partial table below shows the the results of a survey in which sixth, seventh, and eighth grade students were asked if they have a cell phone. Answer the questions to the right.

	Grade 6	Grade 7	Grade 8	Total
Phone	24	32	40	96
No Phone	18	28	8	54
Total	42	60	48	150

a) How many eighth grade students do not have a cell phone?

8

b) How many sixth grade students have a cell phone?

24

25. Complete a relative frequency table using the data from question 24. Round to the nearest hundredth if necessary. Then answer the questions to the right.

	Grade 6	Grade 7	Grade 8	Total
Phone	.16	.21	.27	.64
No Phone	.12	.19	.05	.36
Total	.28	.40	.32	1

a) What percent of the students surveyed do not have a cell phone?

36%

b) What percent of the students surveyed are seventh graders with a cell phone?

21%

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Pre-Algebra Review

QUIZ 10

Name: _____

Date: _____ **Per:** _____

Use for questions 1-2: A deck of cards has an equal number of hearts, diamonds, spades, and clubs. Alex conducted an experiment in which he drew a card at random 60 times. Each time he drew a card, he replaced it before drawing the next card. The results of the experiment are shown below.

Result	Frequency
Heart	15
Diamond	9
Spade	16
Club	20

1. If Alex draws another card, which statement is true regarding the probability he will draw a spade based on this experiment? E: $\frac{4}{15}$ (27%) T: $\frac{1}{4}$ (25%)

A. $\frac{3}{10}$; less than theoretically expected

B. $\frac{4}{15}$; less than theoretically expected

C. $\frac{3}{10}$; more than theoretically expected

(D) $\frac{4}{15}$; more than theoretically expected

2. If Alex draws a card at random 400 times, which of the following statements is true regarding the number of times he should expect to get a heart or a diamond based on the experiment? $\frac{24}{60} = \frac{x}{400}$ $x = 160$

(A) 40 times less than theoretically expected

B. 40 times more than theoretically expected

C. 50 times less than theoretically expected

D. 50 times more than theoretically expected

3. There are 10 sixth graders, 14 seventh graders, and 6 eighth graders on the track team. How many ways can the coach choose one sixth grader, one seventh grader, and one eighth grader? Write your answer in the box.

$10 \cdot 14 \cdot 6$

840

4. Cara randomly chose a date in the month of June then a letter in the word MATHLETE. What is the probability she got a date that is a multiple of 5, followed by a vowel?

$\frac{6}{30} \cdot \frac{3}{8} = \frac{18}{240}$

A. $\frac{13}{48}$

B. $\frac{3}{10}$

C. $\frac{5}{24}$

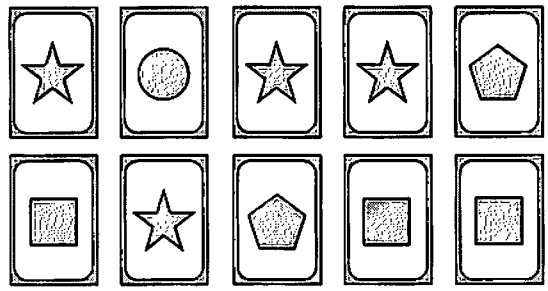
(D) $\frac{3}{40}$

5. Mitchell and Travis are play on a baseball team. Mitchell has 5 hits out of 12 times at bat and Travis has 9 hits out of 20 times at bat. Based on their past performance, what is the probability that they both get a hit next time at bat? Give your answer as a fraction in simplest form.

$\frac{5}{12} \cdot \frac{9}{20} = \frac{45}{240}$

$\frac{3}{16}$

6. Kaitlyn draws one of the cards below at random, does not replace it, then draws another. What is the probability that she gets a card with a star on it both times?



$\frac{4}{10} \cdot \frac{3}{9} = \frac{12}{90}$

A. $\frac{3}{25}$

(B) $\frac{2}{15}$

C. $\frac{4}{25}$

D. $\frac{8}{45}$

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7. The data set below represents the number of points scored by a basketball team in their first 12 games last season. Determine which measure is the greatest.

{118, 99, 104, 109, 122, 106, 99, 119, 102, 90, 84, 96}

(A.) Mean = 104

B. Median = 103

C. Mode = 99

D. Range = 38

8. The data below represents the speed of eight cars on the highway. Find the mean absolute deviation. Write your answer in the box.

{68, 64, 72, 77, 66, 80, 68, 73}

Mean = 71

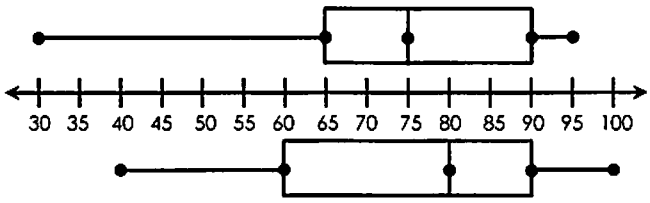
$$\frac{3+7+1+6+5+9+3+2}{8}$$

$= 36/8$

4.5

9. The box plot below shows the test scores in two different classes. Determine which statements are true. Check all that apply.

Class A



Class B

- ☑ Class A had a greater lower quartile.
- ☐ Class B had a lesser median.
- ☐ Class A had a greater interquartile range.
- ☑ Class B had a greater maximum.
- ☑ Class A had a greater range.
- ☑ Both classes had the same upper quartile.

10. If the outside temperature is compared with each variable below, which will most likely have a negative relationship?

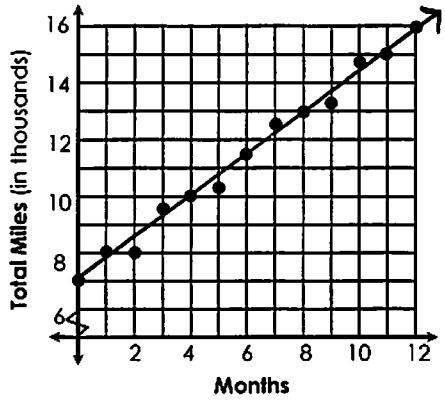
A. number of people at the water park

(B.) distance to the equator

C. sales on air conditioner units

D. the amount of rainfall

11. Josh bought a used car. The graph below shows the total miles on the car each month after he purchased it. Which line best represents this data?



(A.) $y = \frac{3}{4}x + 7$

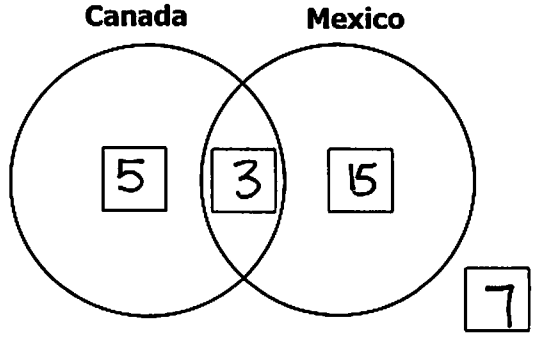
B. $y = \frac{4}{3}x + 7$

C. $y = -\frac{3}{4}x + 7$

D. $y = -\frac{4}{3}x + 7$

12. A partial two-way table below shows the results of a survey in which a group of students were asked if they had been to Canada or Mexico. Using the information from the table, complete the Venn diagram to show the represent the data from the survey. Write the numbers in the boxes.

		Canada		
		Yes	No	Total
Mexico	Yes	3	15	18
	No	5	7	12
	Total	8	22	30



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