

PRE ALGEBRA → ALGEBRA

SUMMER



ASSIGNMENT

As you work through this summer math review, your priority should be the topics and skills that you feel less comfortable with or with which you want to get some extra practice. Focus your time and effort on strengthening those areas. If you feel confident that you have mastered a particular topic, consider completing a few representative problems to keep your skills sharp rather than finishing every problem in that section.

Remember, this review is not about completing as many problems as possible—it is about honestly assessing your strengths and areas for growth. Everyone's mathematical journey is different. Use this opportunity to take ownership of your learning and prepare yourself for success in 8th-grade math and beyond.

Try to work on the pages a little at a time throughout the summer, rather than completing it all at once. Consistent practice is the best way to maintain and improve your mathematical skills.

Have a wonderful summer!

Be proud of yourself for your hard work this year.

Rest, relax, and practice some math!



Mrs. Milligan

Review Topics Included

(Wow! You learned a lot of math this year!)

- Monomials and Exponent Rules
- Operations with Scientific Notation
- Algebraic Expressions
- Equations and Inequalities
- Ratios, Proportions, & Percent
- Functions and Linear Relationships
- Systems of Equations
- Geometry
 - Angle relationships
 - Pythagorean Theorem
 - Transformations
 - Area, perimeter, volume
- Probability and Statistics
- Radicals

EXPONENT RULES

Graphic Organizer

ZERO EXPONENT

$$x^0 = 1$$

Examples:

- $12^0 = 1$
- $5x^0 = 5 \cdot 1 = 5$
- $(-2)^3 n^0 = -8 \cdot 1 = -8$

NEGATIVE EXPONENTS

$$x^{-a} = \frac{1}{x^a}$$

Examples:

- $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$
- $a^{-7} = \frac{1}{a^7}$
- $p^4 q^{-1} = \frac{p^4}{q}$

ADDING & SUBTRACTING MONOMIALS

► COMBINE LIKE TERMS! ◀

(DO NOT CHANGE common variables and exponents.)

Examples:

- $10x + 3x = 13x$
- $7k - 2k^2 + 6k^2 = 4k^2 + 7k$
- $-5m^2n - 4m^2n = -9m^2n$

PRODUCT RULE

$$x^a \cdot x^b = x^{a+b}$$

Examples:

- $9^5 \cdot 9^7 = 9^{12}$
- $a^7 \cdot a^{-1} \cdot b^3 \cdot b^{-5} = a^6 b^{-2} = \frac{a^6}{b^2}$
- $-2x^3 y^7 \cdot 9x^4 y = -18x^7 y^8$

QUOTIENT RULE

$$\frac{x^a}{x^b} = x^{a-b}$$

Examples:

- $\frac{(-2)^{20}}{(-2)^5} = (-2)^{15}$
- $\frac{x^{12}}{x^3} = x^9$
- $\frac{r^2 s^2}{r^2 s^3} = \frac{1}{s}$
- $\frac{28m^5}{4m^3} = 7m^2$

POWER RULE

$$(x^a)^b = x^{ab}$$

Examples:

- $(7^2)^9 = 7^{18}$
- $(w^4)^3 = w^{12}$
- $(-4r^3 s^7)^2 = 16r^6 s^{14}$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples																
Monomials	- A monomial is a <u>number</u>, a <u>variable</u> or a <u>product of a number and variable(s)</u> - Examples: <u>-7</u> <u>3x</u> <u>$\frac{1}{4}xy$</u> <u>x^7</u> <u>$-y^5$</u> - Monomials with the same variables and exponents are <u>like terms</u>!																
Adding & Subtracting Monomials	- To add or subtract monomials, <u>Combine like terms</u>! DO NOT CHANGE the variables and exponents! Directions: Add or subtract the following monomials. <table> <tr> <td>1. $4x + 5x$</td><td>2. $-12ab - 2ab$</td></tr> <tr> <td>3. $7m^2 - 9m^2$</td><td>4. $-8k - (-8k)$</td></tr> <tr> <td>5. $-3r^2s + 11r^2s$</td><td>6. $10pqr + pqr$</td></tr> <tr> <td>7. $15ab^3 - (-15ab^3)$</td><td>8. $10x^5y^2 - 14x^5y^2$</td></tr> <tr> <td>9. $-5m - 2n + n - 3m$</td><td>10. $8xy - 2x + 3y - 5xy + 8x$</td></tr> <tr> <td>11. $7k^2 - k + 12k^2 + 4k$</td><td>12. $-r^3 - 2r^2 - 8r^2 + 5r^3$</td></tr> <tr> <td>13. $8c^2 - 4cd + 3d^2 - cd$</td><td>14. $a^2b^2 + 9ab - 12ab + 3a^2b^2$</td></tr> <tr> <td>15. Find the sum of $8m^3n^2$ and $-3m^3n^2$.</td><td>16. Subtract $-4xy$ from $2xy$.</td></tr> </table>	1. $4x + 5x$	2. $-12ab - 2ab$	3. $7m^2 - 9m^2$	4. $-8k - (-8k)$	5. $-3r^2s + 11r^2s$	6. $10pqr + pqr$	7. $15ab^3 - (-15ab^3)$	8. $10x^5y^2 - 14x^5y^2$	9. $-5m - 2n + n - 3m$	10. $8xy - 2x + 3y - 5xy + 8x$	11. $7k^2 - k + 12k^2 + 4k$	12. $-r^3 - 2r^2 - 8r^2 + 5r^3$	13. $8c^2 - 4cd + 3d^2 - cd$	14. $a^2b^2 + 9ab - 12ab + 3a^2b^2$	15. Find the sum of $8m^3n^2$ and $-3m^3n^2$.	16. Subtract $-4xy$ from $2xy$.
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MULTIPLYING MONOMIALS

To multiply monomials, use the **PRODUCT RULE**:

$$x^a \cdot x^b = x^{a+b}$$

NUMERICAL BASES

Directions: Find each product. Express your final answers using only positive exponents.

17. $4^3 \cdot 4^8$

18. $(-7)^4 \cdot (-7)^5$

19. $2^{-6} \cdot 2^2$

20. $15 \cdot 15^6$

21. $5^9 \cdot 5^{-1}$

22. $(-1)^{-2} \cdot (-1)^{-3}$

VARIABLE BASES

23. $x^2 \cdot x^5$

24. $m^{-1} \cdot m^3$

25. $k^{-7} \cdot k^7$

26. $a \cdot a^3 \cdot a^{-9}$

27. $x^4 \cdot y \cdot x^{-1}$

28. $s \cdot r^{-2} \cdot r^{-4} \cdot s$

➤ **Examples with Coefficients:**

- MULTIPLY the coefficients.
- SIMPLIFY the variables with the product rule.

29. $4a^7 \cdot 2a^3$

30. $(5m) \cdot (-3m^2)$

31. $2w^{-1} \cdot -7w^4 \cdot 3w^5$

32. $8p^{-5} \cdot 2p^{-1} \cdot p$

33. $(-2ab) \cdot (6a^2b^3)$

34. $-12p^8q^{-2} \cdot \frac{1}{3}p^3q^2$

35. $7c^3d^2 \cdot 2cd \cdot -c^3d^8$

36. $(-ab) \cdot (4a^8b^2) \cdot (7ab^6)$

37. $-8k^4 \cdot 2k + 3k^2 \cdot k^3$

38. $9m^6 \cdot 2mn^4 - 4m^2n^3 \cdot 3m^5n$

Name:		Date:	
Topic:		Class:	
Main Ideas/Questions	Notes/Examples		
Dividing Monomials	To divide monomials, use the QUOTIENT RULE : $\frac{x^a}{x^b} = x^{a-b}$		
Numerical Bases	Directions: Find each quotient. Express your final answers using only positive exponents.		
	1. $\frac{12^7}{12^5}$	2. $\frac{(-6)^{12}}{(-6)^4}$	3. $\frac{4^{10}}{4}$
Variable Bases	4. $\frac{9^3}{9^5}$	5. $\frac{8^6}{8^6}$	6. $\frac{(-5)^{-1}}{(-5)^2}$
	7. $\frac{x^{10}}{x^2}$	8. $\frac{w^2}{w^7}$	9. $\frac{p}{p^4}$
	10. $\frac{m^3 n^6}{m^2 n^2}$	11. $\frac{r^2 s^{-5}}{r^{-3} s^2}$	12. $\frac{a^2 b^9 c^4}{a^9 b^3 c^4}$
	➤ Examples with Coefficients: - DIVIDE the coefficients. - SIMPLIFY the variables with the quotient rule.		
	13. $\frac{24c^{10}}{8c^3}$	14. $\frac{-36k^6}{4k^4}$	
	15. $\frac{10x^3}{2x^4}$	16. $\frac{20a^{-12}}{-5a^{-4}}$	

	17. $\frac{3h^4}{6h^{-1}}$	18. $\frac{15v^{15}}{24v^5}$
	19. $\frac{-3r^6}{18r^{10}}$	20. $\frac{8w^{-2}}{20w^9}$
	21. $\frac{-28x^{-4}y^5}{4x^{-4}y^2}$	22. $\frac{16mn^{-2}}{10m^2n^{-8}}$
Mixed Practice	23. $\frac{4x^2 \cdot 3x^7}{6x^6}$	24. $\frac{6n^3}{4n \cdot 7n^9}$
	25. $\frac{-18a^8}{2a^3} \cdot 5a^2$	26. $9w^{-4} \cdot \frac{48w}{6w^3}$
	27. $\frac{8c \cdot 10d^4}{16c^8 \cdot d^2}$	28. $\frac{6r^{-1} \cdot -8s^6}{10r^4 \cdot 4s^{-3}}$
	29. $\frac{15x^{10}y^8}{3x^5y^2} - 7x^5y^6$	30. $(4m^{-1}n^5)(2m^4n^2) + 11m^3n^7$

Name:		Date:	
Topic:		Class:	
Main Ideas/Questions	Notes/Examples		
POWERS OF MONOMIALS	To raise a monomial to a power, use the POWER RULE : $(x^a)^b = x^{ab}$		
NUMERICAL BASES	Directions: Simplify. Express your final answers using only positive exponents.		
	1. $(8^2)^5$	2. $((-15)^6)^3$	3. $(4^{-2})^2$
	4. $(2^4)^{-2}$	5. $(10^{-3})^{-7}$	6. $(3^3)^{-1}$
VARIABLE BASES	7. $(x^9)^3$	8. $(a^2)^7$	9. $(k^4)^{-5}$
	10. $(cd^2)^4$	11. $(m^{-2}n^8)^3$	12. $(x^{-4}y^{-2})^{-7}$
	➤ Examples with Coefficients: • Raise the coefficient to the given power. • SIMPLIFY the variables with the power rule.		
	13. $(3x^7)^2$	14. $(5n^4)^3$	
	15. $(10x^7)^2$	16. $(4w^{-7})^4$	

	17. $(2p^2q^5)^6$	18. $(-7a^8b^3)^2$
	19. $(4c^{-9}d^2)^2$	20. $(-3m^{-2}n^{-5})^3$
	21. $(5k^6)^{-2}$	22. $(2a^5b^{-2})^{-4}$
MIXED PRACTICE	23. $(6w^8)^2 \cdot 5w^3$	24. $(-4a^2)^3 \cdot 2a^7$
	25. $(5p^4 \cdot 3p^3)^2$	26. $(x^{-8}y^{-2} \cdot x^3y^9)^4$
	27. $\frac{56k^{28}}{(-2k^8)^3}$	28. $\frac{(12c^3d^7)^2}{18c^8d^{10}}$
	29. $40m^6n^{21} + (-4m^2n^7)^3$	30. $(4a^8b^2)^3 - (3a^{12}b^3)^2$

Group Members:

Per: _____



Review: Operations with Monomials

Directions: Work together to simplify each expression using the **exponent rules**. Do not divide up the work! Each person should be participating. At the end of class, one person's paper will be chosen at random and graded for the group.

RULES REVIEW

Zero Exponent	Negative Exponent	Product Rule	Quotient Rule	Power Rule
$x^0 =$	$x^{-a} =$	$x^a \cdot x^b =$	$\frac{x^a}{x^b} =$	$(x^a)^b =$

What is the rule for adding and subtracting monomials?

Directions: Fill in the box with the missing exponent.

1. $6^2 \cdot 6^{\square} = 6^{12}$	2. $\frac{(-2)^{\square}}{(-2)^5} = (-2)^{-7}$	3. $(x^5)^{\square} = x^{15}$	4. $3a^5b^8 + a^5b^8 = 4a^{\square}b^{\square}$
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ADDING & SUBTRACTING MONOMIALS

Directions: Simplify each expression.

5. $6w^2 + 11w^2$	6. $-2x^{13}y^6 - 8x^{13}y^6$	7. $-5rs - (-5rs)$
8. $-5ab - 6b + 19ab - b$	9. $4x^2 - 3x - x - 27 + 5x^2$	10. $15mn - m^2 + n^2 - 28mn + 3m^2$
11. Subtract $8rs$ from $(-3rs)$.	12. Find the sum of $2p^5q^7$ and $(-16p^5q^7)$.	

MULTIPLYING & DIVIDING MONOMIALS

Directions: Simplify each expression. Final answers must contain only positive exponents.

13. $x^7 \cdot x^5$	14. $w^{-3} \cdot w^{-4}$	15. $(7k^4)(3k^9)$
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16. $6a^{-2}b^{-1} \cdot (-2a^{11}b^{-4})$	17. $\frac{6^{12}}{6^{14}}$	18. $\frac{m^7 n^{16}}{m^4 n^2}$
19. $\frac{45p^3}{5p^{-1}}$	20. $\frac{20a^{-2}}{-10a^{-10}}$	21. $\frac{16c^{-6}d^{-2}}{12c^{-5}d^2}$

POWERS OF MONOMIALS

Directions: Simplify each expression. Final answers must contain only positive exponents.

22. $(3^4)^5$	23. $(k^3)^8$	24. $(w^{-2})^9$
25. $(9w^7)^2$	26. $(-2a^3b^4)^5$	27. $(4r^2s^{-1})^{-3}$

MIXED PRACTICE

Directions: Simplify each expression. Final answers must contain only positive exponents.

28. $\frac{15h^{16}}{5h^4} \cdot 9h^2$	29. $19x^8y^{18} - (6x^4y^9)^2$	30. $\frac{28p^5}{(2p^4)^3}$
31. $-6m^5n^2 \cdot 2m^2n^9 + 15m^7n^{11}$	32. $(12w^7 \cdot \frac{5}{6}w^{-3})^2$	33. $\frac{-8p^8 \cdot 12p^6}{16p^3}$
34. $-7r^4s^{15} + \frac{20r^{-2}s^{16}}{4r^{-6}s}$	35. $\frac{18x^5y}{10xy^2 - 2xy^2}$	36. $(2c^5d^2 - 5c^5d^2)^4$

Name: _____

Unit 2: Algebraic Expressions

Date: _____ Per: _____

Homework 9: Multiplying & Dividing Numbers
in Scientific Notation**Directions:** Evaluate each expression. Give all final answers in scientific notation.

1. $(9 \times 10^2)(3 \times 10^6)$

2. $(1.2 \times 10^{-1})(7 \times 10^4)$

3. $(6.8 \times 10^8)(7.4 \times 10^{-10})$

4. $(8 \times 10^{-6})(9 \times 10^{-4})$

5. $(5 \times 10^8) \div (8 \times 10^1)$

6. $(6 \times 10^2) \div (2.4 \times 10^{-1})$

7. $(1.8 \times 10^{-10}) \div (6 \times 10^{-2})$

8. $\frac{1.2 \times 10^3}{5 \times 10^9}$

9. $\frac{4.5 \times 10^{-8}}{7.5 \times 10^3}$

10. Find the quotient of 1×10^{-2} and 8×10^{-5} .

11. Find the product of 8.8×10^{-11} and 5.2×10^{-2} .

12. Fill in the missing exponent.

$$(7.1 \times 10^{\square})(9 \times 10^7) = 6.39 \times 10^5$$

13. Fill in the missing exponent.

$$(3 \times 10^{-2}) \div (8 \times 10^{\square}) = 3.75 \times 10^{-9}$$

14. The human heart beats approximately 1.152×10^5 times per day. Approximately how many times does the heart beat per year?

15. The average depth of the Arctic Ocean is 3.953×10^3 feet while the average depth of the Atlantic Ocean is 1.2851×10^4 feet. Approximately how many times more deep is the Atlantic Ocean than the Arctic Ocean?

16. The diameter of Virus A is 2.6×10^{-7} millimeters. If a new virus, Virus B, has a diameter that is 15 times larger than Virus A, find the diameter of Virus B.

Name: _____

Unit 2: Algebraic Expressions

Date: _____ Per: _____

Homework 10: Adding & Subtracting
Numbers in Scientific Notation**Directions:** Evaluate each expression. Give all final answers in scientific notation.

1. $(5 \times 10^4) + (4 \times 10^5)$

2. $(2.7 \times 10^9) - (9 \times 10^8)$

3. $(6.2 \times 10^{-3}) - (1.4 \times 10^{-4})$

4. $(3.4 \times 10^{-15}) + (8.1 \times 10^{-14})$

5. $(7 \times 10^4) - (2.6 \times 10^2)$

6. $(8.5 \times 10^{-1}) + (5.9 \times 10^{-4})$

7. Find the difference of 4.5×10^{-1} and 2×10^{-2} .

8. Find the sum of 1.6×10^2 and 9.2×10^5 .

9. Fill in the missing exponent.

$$(6.5 \times 10^6) - (2.4 \times 10^{\square}) = 6.26 \times 10^6$$

10. Fill in the missing exponent.

$$(8.9 \times 10^{\square}) + (1.7 \times 10^{-12}) = 1.789 \times 10^{-12}$$

11. California has a population of approximately 3.9×10^7 people while Wyoming has a population of approximately 5.8×10^5 people. How many more people live in California than Wyoming?12. An online company ran a two-day sale. They generated 6.2×10^5 dollars on the first day and 1.9×10^6 dollars on the second day. Find the combined revenue for the two days.13. Jack bought an external hard drive with 1 TB, or 1×10^{12} , bytes of available space. So far he has used up 7.4×10^8 bytes. How much space does he have available?14. Find the sum of 4.5×10^{-1} and the quotient of 7×10^{-4} and 8×10^{-3} .

Unit 2 Test Study Guide (Algebraic Expressions)

Name: _____

Date: _____ Per: _____

Topic 1: Translating Expressions

Directions: Translate each expression.

1. "the product of -6 and a number"	2. "the difference between a number and 25"
3. "17 more than the quotient of a number and 4"	4. "13 less than two-thirds of a number"
5. "the sum of renting bowling shoes and \$3 per game"	6. "nine subtracted from twice a number"

Topic 2: Simplifying Expressions

Directions: Simplify each expression.

7. $18 - 6x + 5x - 11$	8. $-2a - 6 + 15a - 21 + 5$	9. $7m + 19m - 11n - 4m + 3n$
10. $6(w + 2)$	11. $-4(2p - 7)$	12. $5(a - 2b)$
13. $7(5x - 2) - 29x + 10$	14. $-3(2 - k) + 11 - 10k$	
15. $18 + 7(4c - 2) - 15c$	16. $-19 - 2(a + 9) + 5a - 3$	
17. $8p - (5p - 13) - 27 + 4p$	18. $-5x - 4(x + 2y) + 9y - 7x$	

Topic 3: Factoring Expressions

Directions: Factor each expression. If it cannot be factored, write "prime."

19. $3x - 15$	20. $10c - 10$	21. $8k + 36$
22. $9r + 24$	23. $27r - 15$	24. $40a + 24b$

Directions: Simplify, then factor each expression.

25. $-7m - 16 + 9m + 2$	26. $18y - (2y + 17) - 11$
27. $-5 + 3(10 - x) + 9x - 1$	28. $3a - 5(a + 2b) + 8(4a - b)$

Topic 4: Operations with Monomials

Directions: Complete the following rules.

Zero Exponent	Negative Exponent	Product Rule	Quotient Rule	Power Rule
$x^0 =$	$x^{-a} =$	$x^a \cdot x^b =$	$\frac{x^a}{x^b} =$	$(x^a)^b =$

Directions: Simplify each expression. Final answers must have positive exponents only.

29. $2ab + 9ab$	30. $-14m^3n^2 - 2m^3n^2$	31. $2k^2 - 2k - 8k + k^2$
32. $5^{10} \cdot 5^2$	33. $r^{-4}s^2 \cdot r^{-3}s^{12}$	34. $(-8p^3q^7)(2p^{-1}q^{-7})$
35. $\frac{2^2}{2^9}$	36. $\frac{48k^{20}}{-8k^4}$	37. $\frac{3a^{-1}b^2}{6a^8b^{-3}}$

38. $(4^{-2})^3$	39. $(9c^4d^7)^2$	40. $(-3m^{-5}n^4)^4$
41. $-2x^7y^4 + \frac{18x^{10}y^3}{3x^3y^{-1}}$	42. $(2k^3)^4 \cdot -3k^2$	43. $\frac{8r^7s^{-2}}{10r^4s \cdot 3r^2s^3}$
44. $(-6a^5b^7)^2 - 17a^{10}b^{14}$	45. $\left(\frac{4}{3}v^7 \cdot 6v^{-4}\right)^2$	46. $18m^9n^2 + 7m^{10}n \cdot -3m^{-1}n$
47. Subtract $9x^3y$ from $-4x^3y$.		48. Find the product of $18p^3q^{-15}$ and $3p^5q^4$.
49. Find the quotient of $-28a^{14}b^5$ and $4a^{11}b^6$.		50. Find $9a^8$ more than the product of $-12a^5$ and $2a^3$.

Topic 5: Polynomials

Directions: Write each expression in standard form.		
51. $25 - 3x$	52. $-11 - 2p^2 + 8p$	53. $4y^2 + 25 - 13y + y^3$
Directions: Simplify each expression. Write all final answers in standard form.		
54. $(4w - 7) + (2w + 23)$	55. $(9h + 10) - (7 + 12h)$	
56. $(4x^2 + 13x - 2) + (x^2 - 5x + 16)$	57. $(2a^2 - a - 11) - (4a^2 + 10a - 11)$	

58. $(10 + k^2 - 8k) - (3k + 17 - 2k^2)$	59. $(-2c - 17 + 9c^2) + (24 - 2c^2 - 2c)$
60. What is $7m - 19$ less than $6 - 2m$?	61. What is $-6p + 1$ increased by $4 - 11p$?

Topic 6: Operations with Scientific Notation

Directions: Evaluate each expression. Give all final answers in scientific notation.

62. $(9 \times 10^{-4})(4 \times 10^{10})$	63. $(8.6 \times 10^{-7})(2.5 \times 10^{-2})$	64. $(2 \times 10^{13}) \div (5 \times 10^3)$
65. $\frac{1.1 \times 10^{-2}}{1.6 \times 10^4}$	66. $(8.2 \times 10^9) + (2.5 \times 10^8)$	67. $(4 \times 10^{-3}) - (9.8 \times 10^{-5})$
68. Asia is approximately 1.7×10^7 square miles while Europe is 3.8×10^6 square miles. How many more square miles is Asia than Europe?		
69. An average of 3.53×10^5 babies are born each day around the world. Approximately how many babies are born around the world in January?		
70. The volume of the moon is approximately 2.2×10^{10} cubic kilometers while the volume of the sun is 1.4×10^{18} cubic kilometers. How many times larger is the volume of the sun than the moon?		

Unit 3 Test Study Guide

(Equations & Inequalities)

Name: _____

Date: _____ Per: _____

Topic 1: One and Two-Step Equations

Directions: Solve each equation. Check all solutions.

1. $-4n = -68$	2. $-5 = \frac{x}{2.4}$	3. $k + \frac{5}{3} = -\frac{7}{4}$
4. $7a - 3 = -31$	5. $16 = 40 - 3p$	6. $-17 + \frac{1}{2}m = -29$
7. $\frac{7}{3}w + 19 = -2$	8. $\frac{r-7}{6} = -5$	9. $-1.5 = \frac{c+13}{-8}$

Topic 2: Solving Equations by Square Roots

Directions: Solve each equation. Check all solutions.

10. $\frac{m^2}{-2} = -98$	11. $9x^2 - 7 = 18$	12. $\frac{3}{4}y^2 - 11 = 232$
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Topic 3: Multi-Step Equations**Directions:** Solve each equation. Check all solutions.***Watch out for special solutions!**

13. $6x - 3 - 11 - 8x = 2$

14. $-9(m + 3) + 14 = -49$

15. $13n + 26 = 8n - 29$

16. $5(2p - 6) = -4(p - 3)$

17. $-2(3a - 8) = \frac{2}{3}(3a - 60)$

18. $2(2v - 9) + 1 = -5v - 17 + 9v$

19. $13 - 2(4r - 5) = 5 - (7 + 8r)$

20. $3(3k - 10) + 1 = 8\left(\frac{3}{2}k + 2\right)$

Topic 4: Translating Equations/Equations Word Problems**Directions:** Translate each equation. **Do not solve.**

21. "Five less than the product of a number and -8 is -77."	22. "The sum of two-ninths of a number and 17 is 21."
23. "Ten subtracted from the quotient of a number and 5 is 18."	24. "The difference between twice a number and 41 is -23."
25. "Fifteen more than a number squared is 19."	26. "The quotient of a number decreased by 7 and -2 is -10."

Directions: Define a variable, set up an equation, and solve.

27. The population of Metsville is 1,274 people less than the population of Eden. If the population of Eden is 9,021 people, what is the population of Metsville?

28. Three-eighths of the seventh grade students were taking advanced math at the beginning of the year, but seven dropped out by the end of the year. If there were 140 students taking advanced math at the end of the year, how many total 7th grade students are there?

29. The sum of two numbers is 61. If the larger number is seven less than three times the smaller number, find both numbers.

30. Caiden and Josh are practicing at a batting cage. Josh has hit nine more than one-half the number of balls that Caiden has. If the sum of their hits is 123, how many balls has Josh hit?

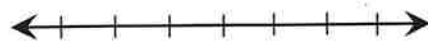
Topic 5: Inequalities

Directions: Solve each inequality. Graph your solution on the number line.

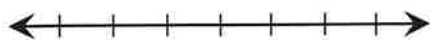
31. $9x - 13 < -58$



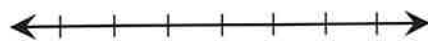
32. $\frac{a}{-3} + 18 \leq 14$



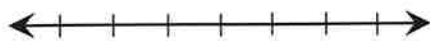
33. $19 - 4p < 55$



34. $\frac{k - 13}{5} \leq -3$



35. $-\frac{4}{7}(v + 28) < -8$



36. $11n - 14 \leq 5n + 4$



37. $\frac{1}{2}(8c + 10) > 4(2c - 6) + 1$



38. $8(5 - 2y) \geq 15 - 9(2y + 3)$



Directions: Solve each inequality. Check the numbers that represent solutions.

39. $-8x + 19 < -13$

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6

40. $38 - m \leq 4(2 - m)$

- ☐ -13
- ☐ -12
- ☐ -11
- ☐ -10
- ☐ -9

Topic 6: Translating Inequalities/Inequality Word Problems

Directions: Translate each inequality. **Do not solve.**

41. "A number is less than or equal to 4."

42. "The product of a number and -7 is greater than 42."

43. "Five less than the quotient of a number and 3 is no less than 11."

44. "The sum of one and three-fifths of a number is at most 42."

Directions: Define a variable, set up an inequality, and solve.

45. Michelle is taking a 50 question science test in which each question is worth 2 points each. If she must get at least a 92 on the test to make an A for the class, how many questions must she get correct?

46. Camille stopped at the grocery store to buy milk. While at the store, she spotted cans of soup on sale for \$2.25 each. If the milk costs \$3.50 and she can spend no more than \$35, how many cans of soup can she buy?

47. Jackson earns \$25 per hour as a tutor at the college library. He set a weekly spending budget of \$130 each week and puts the remaining money in his savings account. How many hours must he work this week in order to have at least an extra \$50 to put in his savings account?

Unit 4 Test Study Guide

(Ratio, Proportion, & Percent)

Name: _____

Date: _____ Per: _____

Topic 1: Ratio & Rates

Use for questions 1-3: A tray of muffins contains 10 chocolate chip muffins, 12 blueberry muffins, 2 pumpkin muffins, and 8 corn muffins. Write each ratio in simplest form.

1. pumpkin muffins to chocolate chip muffins

2. blueberry muffins to corn muffins

3. chocolate chip muffins to total muffins

Write each ratio in simplest form. (*Remember to convert the measurement!*)

4. 8 feet to 6 yards

5. 76 centimeters to 1 meter

6. 6 cups to 4 pints

7. 9 gallons to 21 quarts

8. 45 seconds to 2 hours

9. 4 years to 8 months

Round to the nearest tenth or cent when necessary.

10. In five games of bowling, Gabe's combined score was 380. Find his score per game.

11. It took Ciera 24 minutes to drive 18 miles. It took James one hour to drive 46 miles. Who is driving at a faster rate?

Determine if Option A or Option B is the better deal. Justify your answer.

12. ☐ Option A: 2 lbs of pears for \$1.98
☐ Option B: 5 lbs of pears for \$4.60

13. ☐ Option A: a pack of 6 pens for \$4.74
☐ Option B: a pack of 15 pens for \$12.19

Topic 2: Proportional Relationships & Solving Proportions

Determine if a proportional relationship exists. If yes, give the constant rate.

14.

Minutes	1	8	18	32
Calories Burned	9	72	162	256

15.

Hours	2	6	8	14
Snowfall (in)	5	15	20	35

Determine if the ratios form a proportion.

16. $\frac{5}{27}, \frac{3}{16.2}$

17. $\frac{34}{9}, \frac{25}{7}$

Solve the proportion.

18. $\frac{x}{12} = \frac{15}{40}$

19. $\frac{20}{9.5} = \frac{36}{m}$

20. In a cookie recipe, $1\frac{2}{3}$ cups of milk makes 16 cookies. How many cups of milk are needed to make 24 cookies?

21. Runners in the half marathon entered in three waves. There were 341 runners in the first wave, 295 runners in the second wave, and 316 runners in the third wave. If seven out of eight runners finished the race, how many did not finish?

Topic 3: Scale Drawings & Models

22. On a map with a scale of 0.5 inch = 75 miles, the distance between two cities is 2.75 inches. Find the actual distance between the cities.

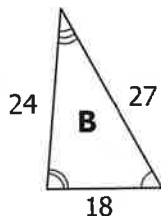
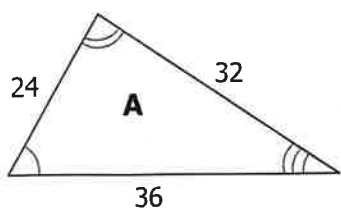
23. A model of the Cape Hatteras Lighthouse uses a scale of 8 inches = 30 feet. If the actual lighthouse is 210 feet tall, how tall is the model? Give your answer in feet.

24. Nate made a model of the USS Massachusetts Battleship that is 3 feet long. If the actual battleship is 681 feet long, what scale did he use?

25. Mr. Willis is building a new dock at his lakehouse that will be 35 feet long. If the blueprints show the dock as 16 inches long, what scale was used to create the blueprint?

Topic 4: Similar Figures & Indirect Measure

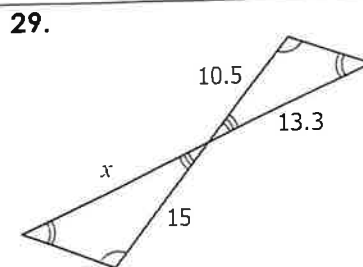
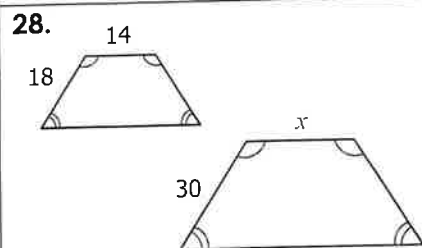
Use the similar figures below for questions 26-27.



26. Give the scale factor of Figure A to Figure B.

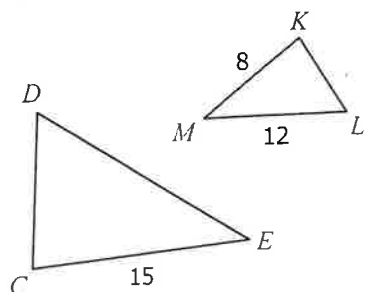
27. Give the scale factor of Figure B to Figure A.

If the figures below are similar, find the value of x .

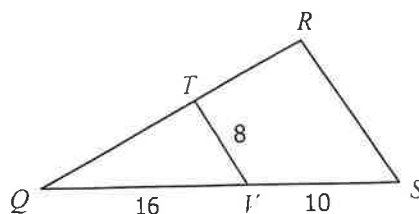


Use the given information to find each measure.

30. Given $\triangle CDE \sim \triangle KLM$, find DE .



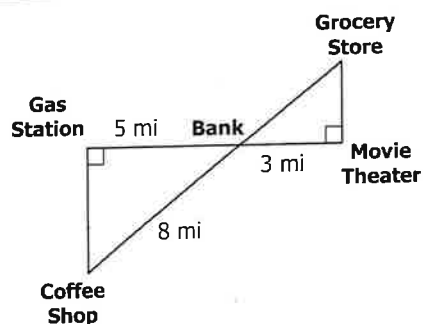
31. Given $\triangle QRS \sim \triangle QTV$, find RS .



32. A flagpole casts a 20-foot shadow at the same time Lexi casts a 5-foot shadow. If Lexi is 5'9", find the height of the flagpole.

33. A 15-foot street lamp casts a 9-foot shadow. If the street lamp is near a 71-foot building, find the length of the shadow casted by the building.

Use the diagram below to answer questions 34-35.



34. Find the distance from the bank to the grocery store.

35. Find the distance from the coffee shop to the grocery store, then back to the bank.

Topic 5: Percents

36. What percent of 80 is 18?

37. Find 42% of 135.

38. 10.2 is 21.25% of what number?

39. At Wally's school, 30% of the students are in 8th grade. If there are 470 students total, find the number of 8th grade students.	40. Laura spent 78.5% of her paycheck on her mortgage payment. If her mortgage was \$1,226.17, how much was her paycheck?
41. A stereo that regularly costs \$429.99 is on sale for 35% off. How much money will be discounted from the regular price?	42. Gas prices are typically marked up for holiday travel. If the prices are marked up 17.5% and the regular price per gallon is \$2.40, how much will Mitch pay for 16 gallons of gas?
43. Claire is buying a new bicycle for \$295. If the sales tax is 4.75%, what will she pay in total?	44. A \$1,349 television is on sale for 20% off. If sales tax is 8%, find the price of the television including tax.
45. The Barnes family has a coupon for 10% off their dinner. If their bill comes to \$82.50 and they wish to tip 15%, what will they pay in total?	46. A sign above a basket of DVDs reads "3 for \$17." Kellen decides to buy 6 DVDs and use a coupon for 25% off. If sales tax is 6%, what will he pay in total?

47. Manny bought a car for \$32,985. Five years later, the car was worth \$19,500. Find the percent change in the value of the car. Classify as a percent increase or percent decrease.	48. A painting that sold for \$4,500 in 2013 is now worth \$7,900. Find the percent change in value from then until now. Classify as a percent increase or decrease.
---	--

Topic 6: Simple Interest

Assume each problem below refers to simple interest. Round to the nearest tenth or cent when necessary.	
49. Suppose \$3,750 is placed in a savings account for 4 years. Find the interest earned if the interest rate is 1.85%.	50. Simone borrowed \$13,500 from the bank to purchase a used car. If the interest rate on this 72-month loan is 5.9%, how much will Simone pay in total back to the bank?
51. Rylan placed \$1,200 in a retirement account. Seven years later, it had earned \$546 in interest. Find the interest rate.	52. Alexia took out a 12-year loan for \$72,000 to renovate her home. If her monthly payments are \$680, what is the interest rate?
53. How many years will it take a \$5,000 investment to reach \$7,500 at an 8% interest rate?	54. Andy took out a 5-year loan at a 12.5% interest rate to pay for a trip to Spain. If he ended up paying \$4,937.50 in interest, how much was the trip?

Unit 5 Test Study Guide

(Functions & Linear Relationships)

Name: _____

Date: _____ Per: _____

Topic 1: Relations & Functions

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

1.

$$\{(-2, 6), (-5, -1), (3, 7), (-5, 0)\}$$

Domain: _____

Range: _____

Function? _____

2.

x	0	4	7	10	13
y	-5	-5	-5	-5	-5

Domain: _____

Range: _____

Function? _____

3.

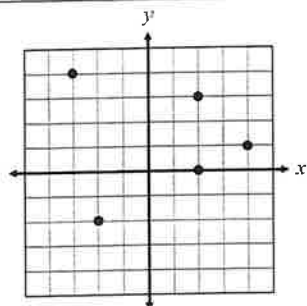
x	-3	-2	-1	0	1
y	-27	-8	-1	0	1

Domain: _____

Range: _____

Function? _____

4.

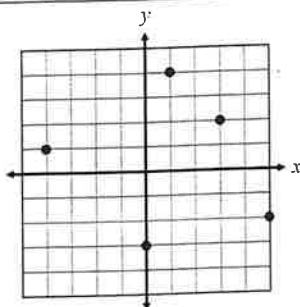


Domain: _____

Range: _____

Function? _____

5.

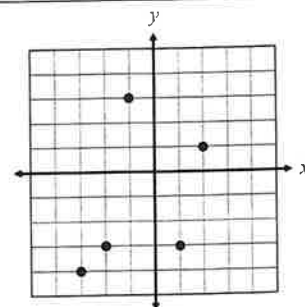


Domain: _____

Range: _____

Function? _____

6.



Domain: _____

Range: _____

Function? _____

Topic 2: Equations as Functions

Directions: Given the function and its domain, find the range.

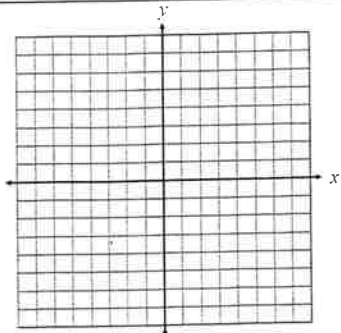
7. $y = 5x + 11$; domain = $\{-4, -1, 0\}$

8. $y = 9 - \frac{1}{2}x$; domain = $\{-6, -2, 8\}$

Directions: Complete each function table, then graph.

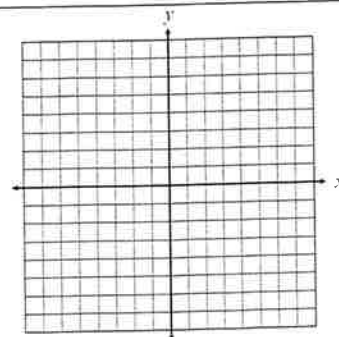
9. $y = -2x + 7$

x	y
0	
3	
4	
6	



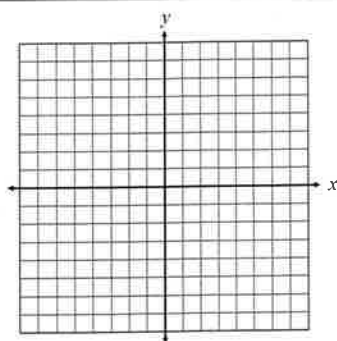
10. $y = -x - 4$

x	y
-8	
-5	
1	
3	



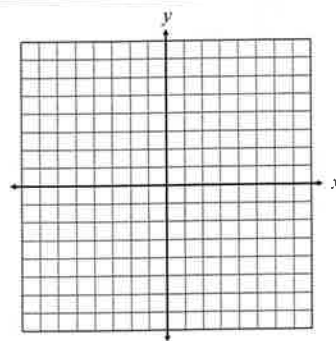
11. $y = \frac{5}{2}x - 1$

x	y
-2	
0	
2	
4	



12. $y = 2 - \frac{4}{3}x$

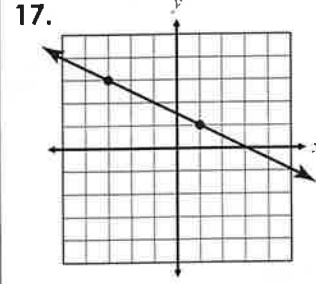
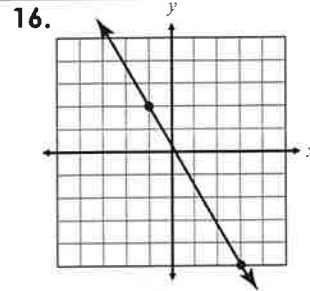
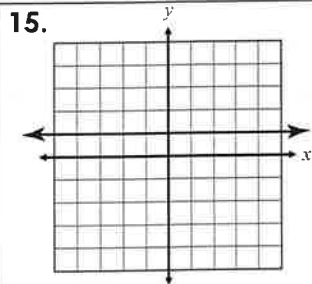
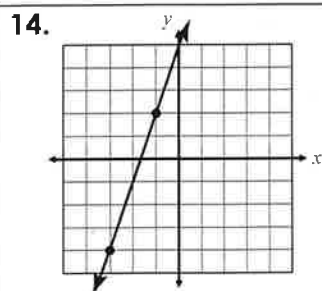
x	y
-3	
0	
3	
6	



Topic 3: Slope

13. Identify and draw pictures of the four types of slope.

Directions: Find the slope of the line given the graph.



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

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

18. $(-2, 4)$ and $(-3, 9)$

19. $(7, -5)$ and $(1, -13)$

20. $(4, -9)$ and $(4, 1)$

21. $(7, -3)$ and $(-9, 5)$

Topic 4: Slope Applications (Rate of Change)

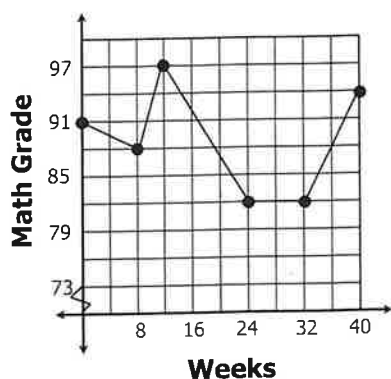
22. The table below shows the balance of a checking account on certain dates during the month of February.

Date	1	7	15	24
Balance (\$)	443	872	610	1,050

a) Find the rate of change from February 1st to February 7th.

b) Find the rate of change from February 7th to February 15th.

23. The graph below shows Noah's math grade during certain weeks of the school year.



- a) Find the rate of change in Noah's grade from week 12 to week 24.

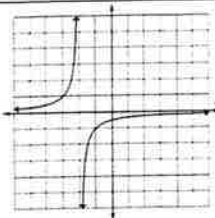
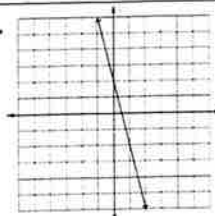
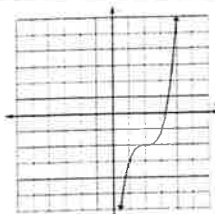
- b) Find the rate of change in Noah's grade from week 24 to week 32.

- c) Find the rate of change in Noah's grade from week 32 to week 40.

24. Mikayla went on a road trip. Two hours into the trip, she had 15 gallons of gas in her tank. Seven hours into her trip, she had 3 gallons of gas in her tank. Find the rate of change.

25. In 2006, the average NFL ticket price was \$62. If the average ticket price in 2015 was \$86, find the rate of change.

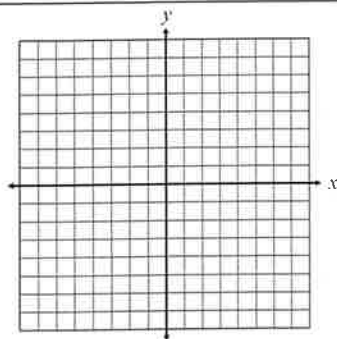
Topic 5: Linear vs. Nonlinear Functions

Topic 5: Linear vs. Nonlinear Functions																																
Slope-Intercept Form		Standard Form																														
Directions: Determine if each graph, equation, or table represents a linear or nonlinear function.																																
26. 	27. 	28. 																														
29. $y = 1 - 3x$	30. $y = \frac{-6}{x}$	31. $2x - 3y = 15$																														
32. $x^2 + y^2 = 9$	33. $y = \frac{x}{-2} - 7$	34. $y = x^3 + 4$																														
35. <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>0</td><td>2</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>8</td></tr><tr><td>3</td><td>16</td></tr></table>	x	y	0	2	1	4	2	8	3	16	36. <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>-5</td><td>-8</td></tr><tr><td>-3</td><td>-9</td></tr><tr><td>-1</td><td>-10</td></tr><tr><td>1</td><td>-11</td></tr></table>	x	y	-5	-8	-3	-9	-1	-10	1	-11	37. <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>3</td><td>-5</td></tr><tr><td>8</td><td>-1</td></tr><tr><td>13</td><td>3</td></tr><tr><td>18</td><td>7</td></tr></table>	x	y	3	-5	8	-1	13	3	18	7
x	y																															
0	2																															
1	4																															
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-1	-10																															
1	-11																															
x	y																															
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8	-1																															
13	3																															
18	7																															

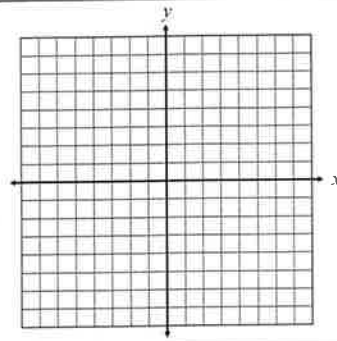
Topic 6: Graphing Linear Equations

Directions: Graph each equation. Show all work for converting standard form to slope-intercept form.

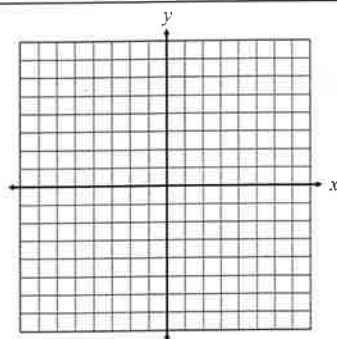
38. $y = -x + 3$



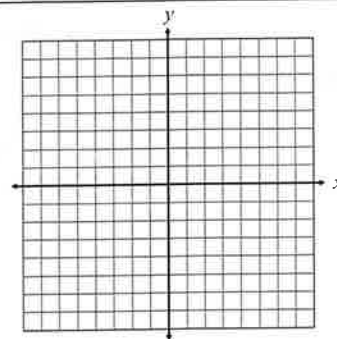
39. $y = \frac{7}{5}x - 6$



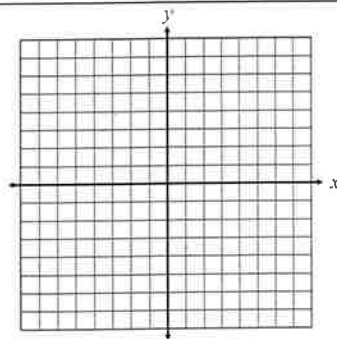
40. $2x + y = -3$



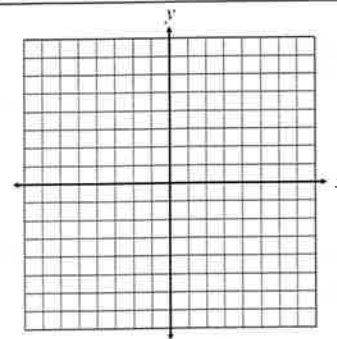
41. $x - y = 5$



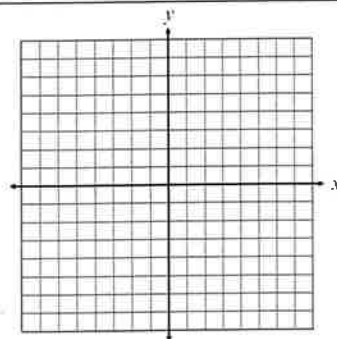
42. $4x - 3y = -21$



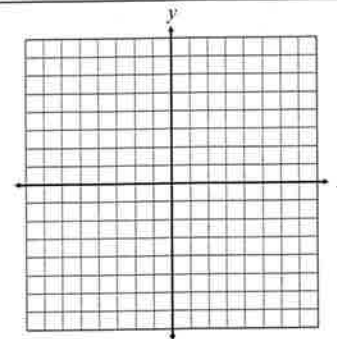
43. $-x - 4y = 0$



44. $y = 6$

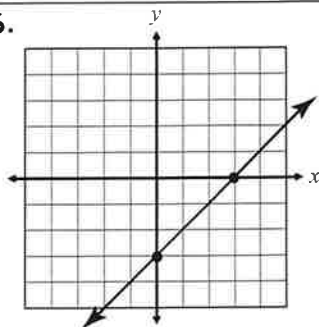


45. $x = -1$

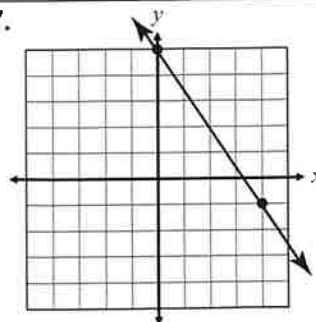


Directions: Write the equation of the line shown on the graph in slope-intercept form.

46.



47.



Topic 7: Slope-Intercept Form Applications

48. Brynn has \$1,200 in her savings account and plans to save an additional \$350 each month in order to purchase a car. Write an equation to represent the total amount she has saved each month. Identify your variables.	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?
49. A long distance phone call costs \$1.75 plus \$0.30 for each minute of the call. Write and solve a linear equation to find the length of a phone call that cost \$7.45.	
50. On October 1st, the high temperature was 72° F. Each day after that, the high temperature decreased by 0.4° F. Write and solve an equation to find the high temperature on October 20th.	

Topic 8: Direct Variation

A direct variation 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																																									
Directions: Determine if the values in the table represents a direct variation. If yes, identify the constant of variation and write an equation to represent the relationship.																																											
51. <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-3</td> <td>9</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>2</td> <td>-6</td> </tr> <tr> <td>4</td> <td>-12</td> </tr> </tbody> </table>	x	y	-3	9	0	0	2	-6	4	-12	52. <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>2</td> <td>6</td> </tr> <tr> <td>3</td> <td>10</td> </tr> <tr> <td>4</td> <td>14</td> </tr> </tbody> </table>	x	y	1	2	2	6	3	10	4	14	53. <table border="1"> <thead> <tr> <th>Miles</th> <th>Toll (\$)</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>1.80</td> </tr> <tr> <td>28</td> <td>\$2.45</td> </tr> <tr> <td>45</td> <td>\$3.85</td> </tr> <tr> <td>72</td> <td>\$5.76</td> </tr> </tbody> </table>	Miles	Toll (\$)	20	1.80	28	\$2.45	45	\$3.85	72	\$5.76	54. <table border="1"> <thead> <tr> <th>Gallons</th> <th>Miles</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>21</td> </tr> <tr> <td>2</td> <td>42</td> </tr> <tr> <td>3</td> <td>63</td> </tr> <tr> <td>4</td> <td>84</td> </tr> </tbody> </table>	Gallons	Miles	1	21	2	42	3	63	4	84
x	y																																										
-3	9																																										
0	0																																										
2	-6																																										
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4	84																																										

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

55. $y = 7x$

56. $y = \frac{9}{x}$

57. $\frac{y}{x} = \frac{1}{3}$

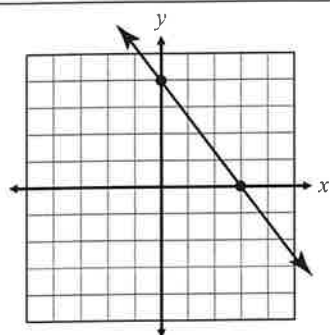
58. $x + 3y = 0$

59. $5x + 2y = 10$

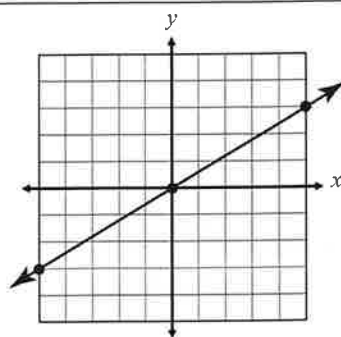
60. $4y = -5x$

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

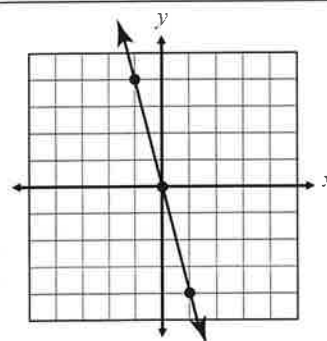
61.



62.



63.



64. The amount of interest earned on a savings account varies directly with the amount of money saved. If \$34 is earned on a balance of \$850, identify the constant of variation and write an equation to represent the relationship.

65. The distance traveled by a bus is directly proportional to the length of time it travels. If it took the bus 3 hours to drive 156 miles, identify the constant of variation and write an equation to represent the relationship.

66. The number of gallons needed to paint a house varies directly to the square feet the paint will cover. If two gallons of paint covers 700 square feet, find the number of gallons needed to cover 2,000 square feet.

67. The depth of a diver is directly proportional to the time since the diver entered the water. If it took the diver 45 minutes to reach a depth of 80 feet, find the time it will take to reach a depth of 200 feet.

Unit 6 Test Study Guide

(Systems of Equations)

Name: _____

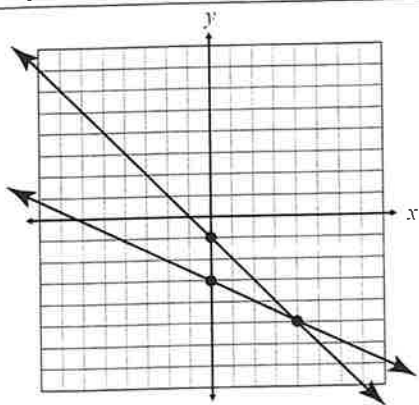
Date: _____ Per: _____

Topic 1: Writing Systems of Equations & Identifying Solutions

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

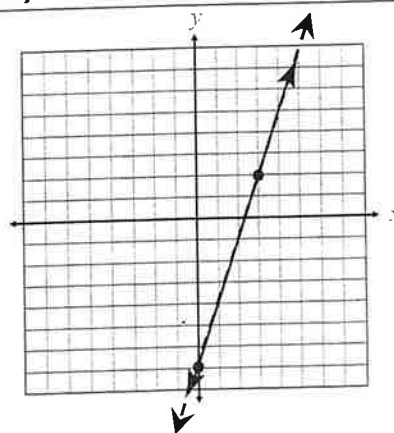
Write the system of equations shown on the graph and identify the solution.

1.



Solution: _____

2.



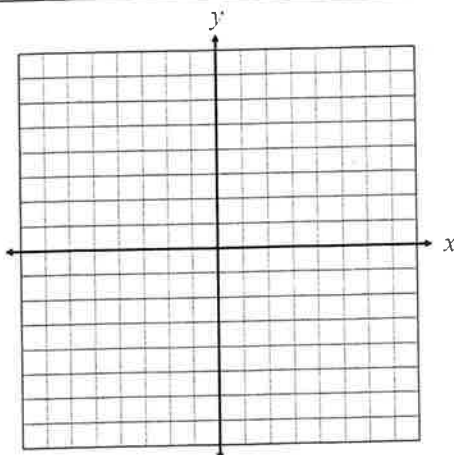
Solution: _____

Topic 2: Solving Systems of Equations by Graphing

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

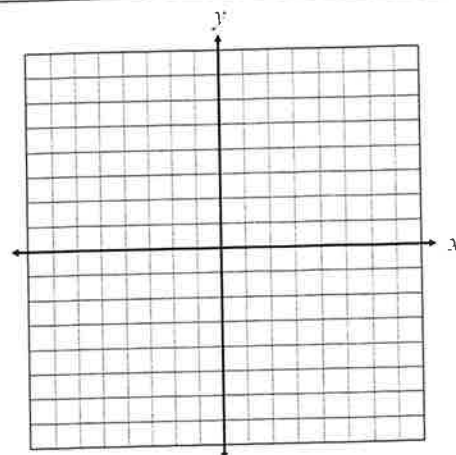
3.

$$\begin{cases} y = x - 3 \\ y = -\frac{1}{4}x - 8 \end{cases}$$

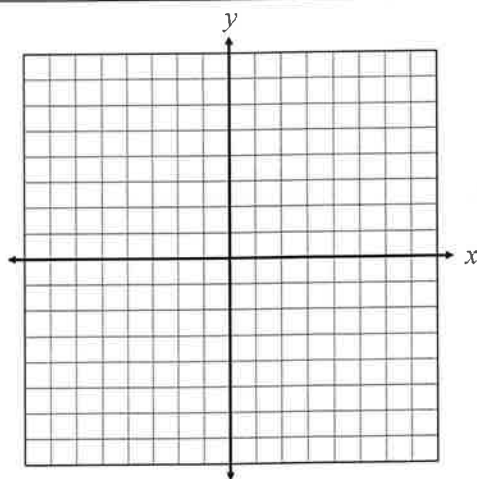


4.

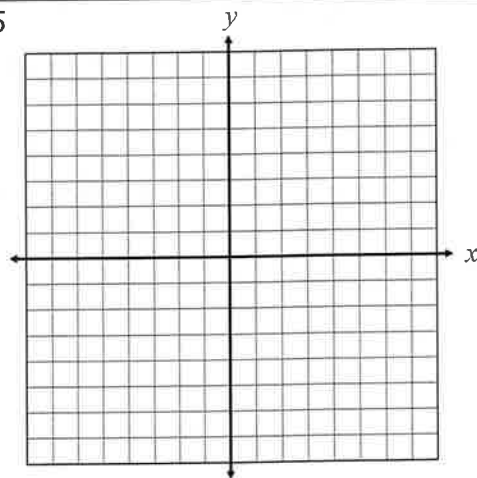
$$\begin{cases} y = -\frac{2}{3}x - 6 \\ y = -4 \end{cases}$$



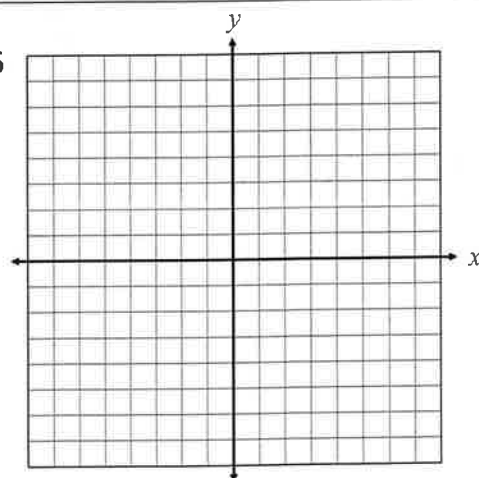
5. $\begin{cases} 3x - y = 8 \\ 5x + 2y = 6 \end{cases}$



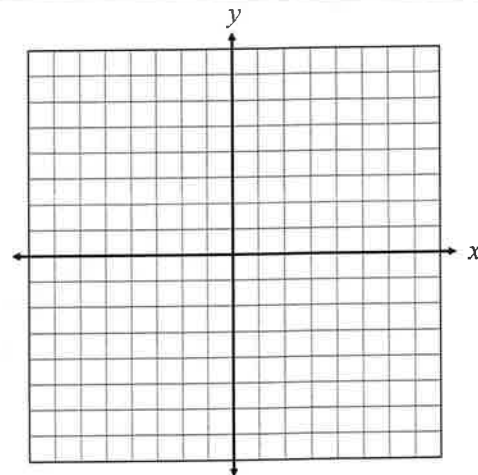
6. $\begin{cases} 3x - 5y = -5 \\ x + y = -7 \end{cases}$



7. $\begin{cases} x - y = 4 \\ 3x - 3y = -6 \end{cases}$



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



Topic 3: Solving Systems of Equations by Substitution

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

9. $\begin{cases} y = 2x - 13 \\ y = -4x + 29 \end{cases}$

10. $\begin{cases} y = 6x + 14 \\ 2x - y = 2 \end{cases}$

$$11. \begin{cases} 9x - 2y = 15 \\ 7x + y = 4 \end{cases}$$

$$12. \begin{cases} x - 2y = -15 \\ 9x + 7y = -10 \end{cases}$$

Topic 4: Solving Systems of Equations by Elimination

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

$$13. \begin{cases} y = 5x + 17 \\ y = -6x - 5 \end{cases}$$

$$14. \begin{cases} 2x - 3y = 0 \\ 2x + y = -16 \end{cases}$$

$$15. \begin{cases} x - 3y = -12 \\ 5x - 3y = -48 \end{cases}$$

$$16. \begin{cases} 4x + y = 7 \\ 8x + 2y = 14 \end{cases}$$

Topic 5: Solving Systems of Equations Applications

17. The sum of two numbers is 71. If their difference is 37, find both numbers.

Variables:

Solve:

System:

Solution:

18. The florist charges \$31.75 for eight roses and five carnations. For one rose and three carnations, it costs \$5.75. What is the cost for a carnation?

Variables:

Solve:

System:

Solution:

19. Mitch bought a total of 13 pizzas and buckets of wings for his big Super Bowl party. If it costs \$11.75 for a pizza and \$19.95 for a bucket of wings and he spent \$193.75, how many buckets of wings did he buy?

Variables:

Solve:

System:

Solution:

20. A total of 800 pre-sale tickets and tickets at the gate were sold to the football city championship game. If the number of tickets sold at the gate was thirteen less than twice the number of pre-sale tickets, how many pre-sale tickets were sold?

Variables:

Solve:

System:

Solution:

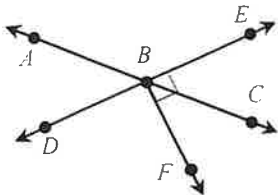
Unit 7 Test Study Guide (Geometry)

Name: _____

Date: _____ Per: _____

Topic 1: Basic Angle Relationships

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



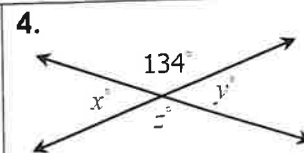
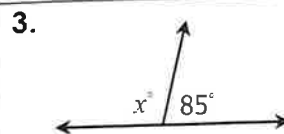
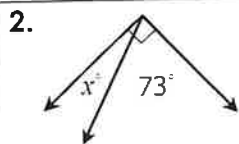
a) $\angle ABE$ and $\angle EBC$

b) $\angle ABD$ and $\angle EBC$

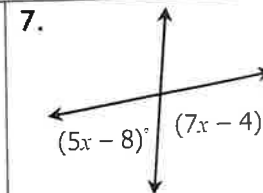
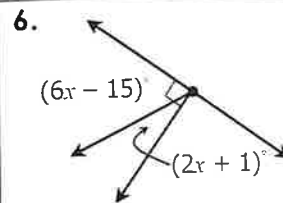
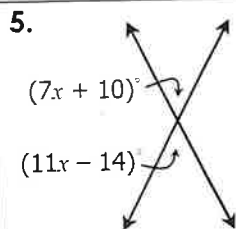
c) $\angle EBC$ and $\angle CBF$

d) $\angle ABD$ and $\angle DBF$

Find each measure.



Find the value of x .



8. If $\angle X$ and $\angle Y$ are supplementary angles and $m\angle Y = 61^\circ$, find $m\angle X$.

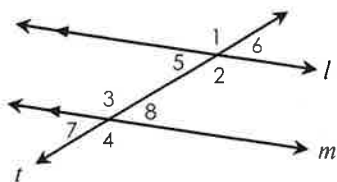
9. If $\angle A$ and $\angle B$ are complementary angles and $m\angle A = 22^\circ$, find $m\angle B$.

10. $\angle 1$ and $\angle 2$ are vertical angles. If $m\angle 1 = (7x + 20)^\circ$ and $m\angle 2 = (9x - 14)^\circ$, find $m\angle 1$.

11. $\angle J$ and $\angle K$ are supplementary angles. If $m\angle J = (13x - 10)^\circ$ and $m\angle K = (8x + 1)^\circ$, find $m\angle K$.

Topic 2: Parallel Lines Cut by a Transversal

12. Using the diagram below, classify the angle pair as alternate interior angles, alternate exterior angles, corresponding angles, consecutive interior angles, or "no relationship."



a) $\angle 6$ and $\angle 7$

b) $\angle 3$ and $\angle 5$

c) $\angle 2$ and $\angle 4$

d) $\angle 1$ and $\angle 8$

e) $\angle 2$ and $\angle 3$

f) $\angle 5$ and $\angle 7$

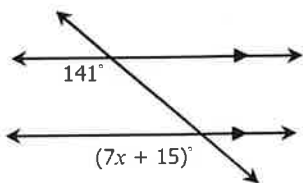
13. In the diagram above, if $m\angle 8 = 48^\circ$, find each angle measure.

$$m\angle 1 = \underline{\hspace{2cm}} \quad m\angle 3 = \underline{\hspace{2cm}} \quad m\angle 5 = \underline{\hspace{2cm}} \quad m\angle 7 = \underline{\hspace{2cm}}$$

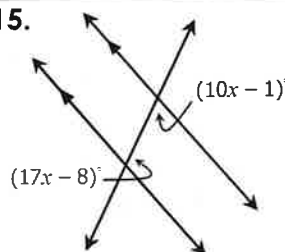
$$m\angle 2 = \underline{\hspace{2cm}} \quad m\angle 4 = \underline{\hspace{2cm}} \quad m\angle 6 = \underline{\hspace{2cm}}$$

Find the value of x .

14.

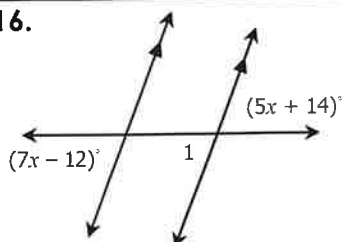


15.

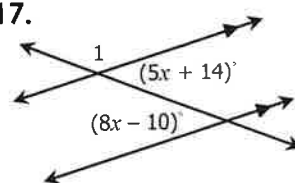


Find $m\angle 1$.

16.



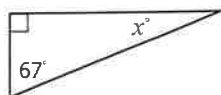
17.



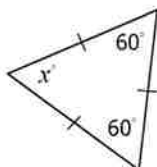
Topic 3: Triangles & The Pythagorean Theorem

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

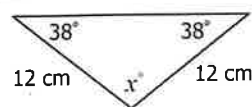
18.



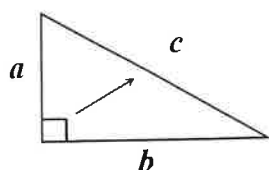
19.



20.



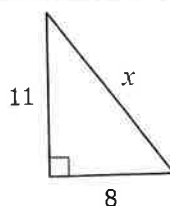
Pythagorean Theorem:



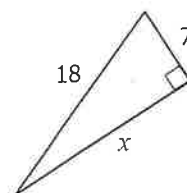
where a and b are the
 _____ and c ,
 the longest side, is the

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

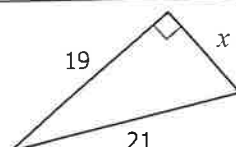
21.



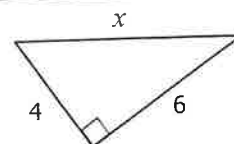
22.



23.



24.



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

☐ 6, 8, 10

☐ 4, 7, 8

☐ 9, 12, 18

☐ 7, 24, 25

☐ 14, 16, 30

Solve each word problem using a picture to assist you. Round to the nearest tenth if necessary.

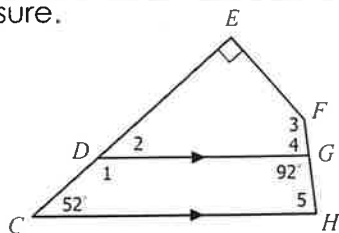
26. A 27-foot long wire is attached from a stake in the ground to the top of a 24-foot flagpole. Find the distance from the stake in the ground to the flagpole.

27. Morgan just got her permit and is practicing driving in a parking lot with her Dad. She drives 18 meters north then 23 meters west. How far is she from her starting point?

28. A painter leans a 28-foot ladder against a house so that the base of the ladder is 9 feet from the house. How high up the house does the ladder reach?

Topic 4: Quadrilaterals

29. Find each missing angle measure.



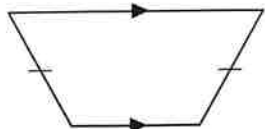
$m\angle 1 = \underline{\hspace{2cm}} \quad m\angle 4 = \underline{\hspace{2cm}}$

$m\angle 2 = \underline{\hspace{2cm}} \quad m\angle 5 = \underline{\hspace{2cm}}$

$m\angle 3 = \underline{\hspace{2cm}}$

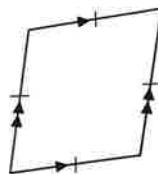
Classify each figure using all names that apply.

30.



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

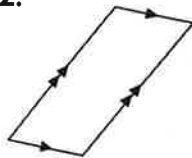
31.



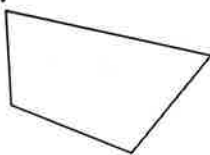
- ☐ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☐ Parallelogram
- ☐ Rectangle
- ☐ Rhombus
- ☐ Square

Classify each figure using the name that best describes it.

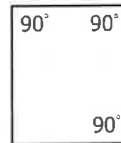
32.



33.



34.



Determine if the statement is true or false.

35. A parallelogram is sometimes a square.

36. A trapezoid is never a quadrilateral.

37. A square is always a rhombus.

38. A quadrilateral is always a parallelogram.

Topic 5: Polygons

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



$n = \underline{\hspace{2cm}}$

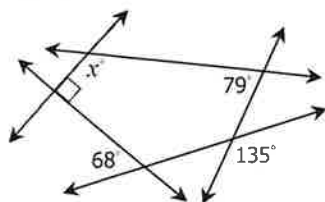
39. Find the sum of the measures of the interior angles.

a) decagon

b) 19-gon

c) 26-gon

40. Find the measure of the missing angle.



41. An octagon has interior angles that measure 134° , 125° , 98° , 141° , 159° , 116° , and 148° . Find the measure of the remaining angle.

42. If quadrilateral $ABCD \cong$ quadrilateral $EFGH$, identify the congruent parts.

$\angle A \cong$

$\overline{EF} \cong$

$\angle B \cong$

$\overline{FG} \cong$

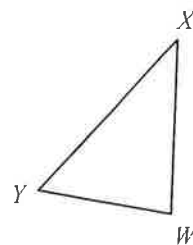
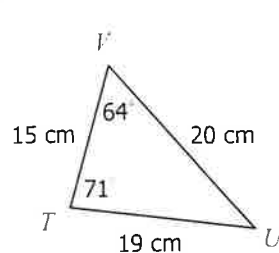
$\angle C \cong$

$\overline{GH} \cong$

$\angle D \cong$

$\overline{EH} \cong$

43. If $\triangle TUV \cong \triangle WXY$, find each measure.



$m\angle W =$

$WX =$

$m\angle X =$

$WY =$

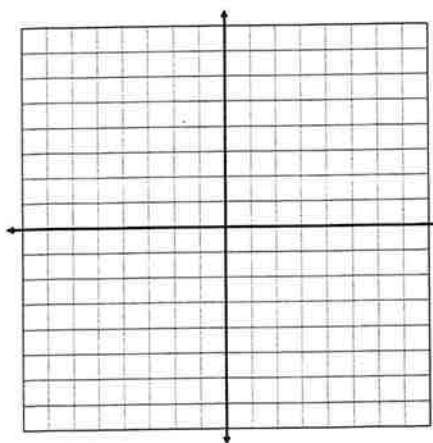
$m\angle Y =$

$XY =$

Topic 6: Transformations

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

44. Rhombus $MNOP$ with vertices $M(5, -1)$, $N(7, -4)$, $O(5, -7)$, and $P(3, -4)$; reflection in the x -axis.



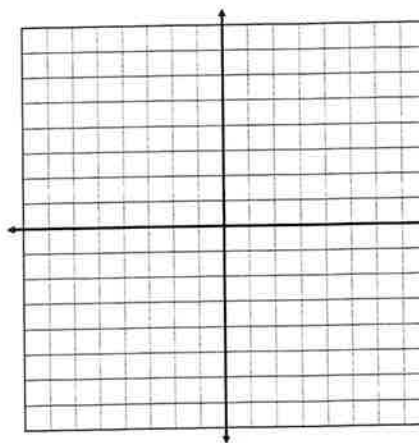
$M'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$N'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$O'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$P'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

45. Trapezoid $ABCD$ with vertices $A(-1, -1)$, $B(0, -3)$, $C(-4, -7)$, and $D(-7, -1)$; reflection in the y -axis.



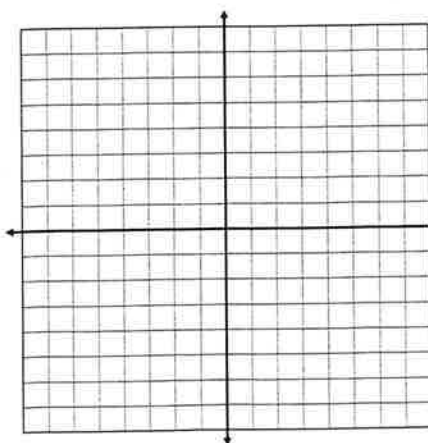
$A'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$B'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$C'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$D'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

46. Quadrilateral $WXYZ$ with vertices $W(-3, 8)$, $X(2, 5)$, $Y(-1, 2)$, and $Z(-6, 0)$; translated along the rule $(x, y) \rightarrow (x - 1, y - 6)$



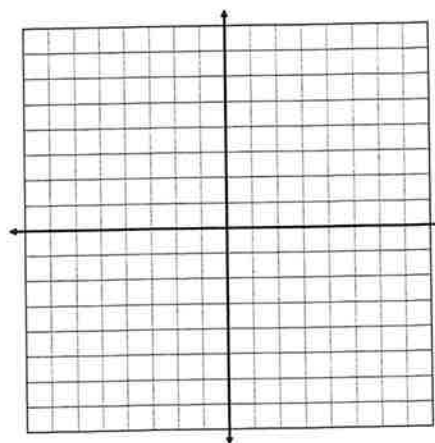
$W'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$X'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$Y'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$Z'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

47. Triangle QRS with vertices $Q(-3, -1)$, $R(-2, -8)$, and $S(-5, -4)$; 90° counterclockwise rotation

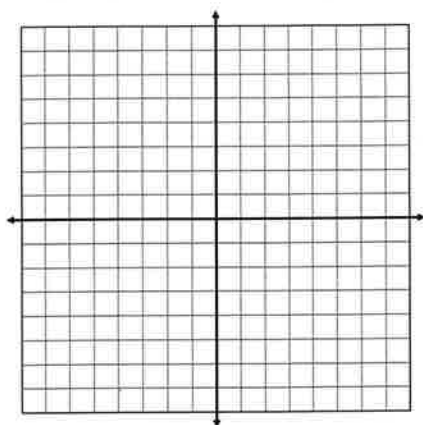


$Q'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$R'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

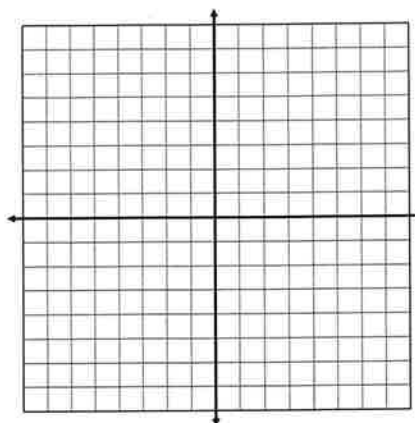
$S'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

48. Parallelogram $JKLM$ with vertices $J(6, 7)$, $K(3, 8)$, $L(5, 2)$, and $M(8, 1)$; 180° rotation



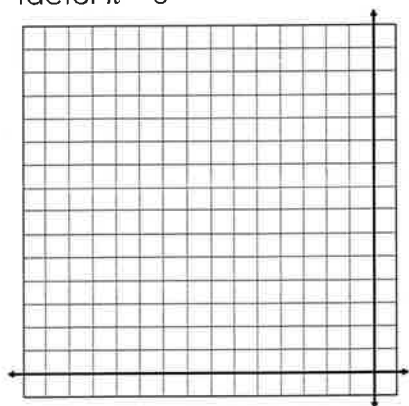
J' (____, ____)
 K' (____, ____)
 L' (____, ____)
 M' (____, ____)

49. Triangle DEF with vertices $D(2, -1)$, $E(5, 0)$, and $F(6, -7)$; 270° counterclockwise rotation



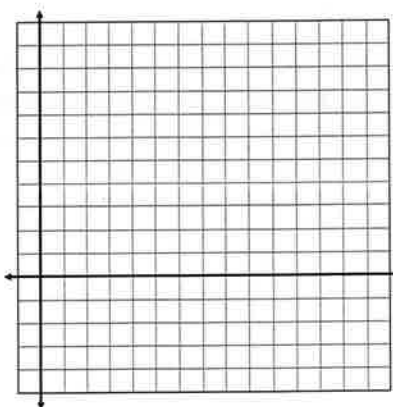
D' (____, ____)
 E' (____, ____)
 F' (____, ____)

50. Quadrilateral $GHIJ$ with vertices $G(-1, 5)$, $H(0, 2)$, $I(-1, 1)$, and $J(-4, 0)$; dilation with scale factor $k = 3$



G' (____, ____)
 H' (____, ____)
 I' (____, ____)
 J' (____, ____)

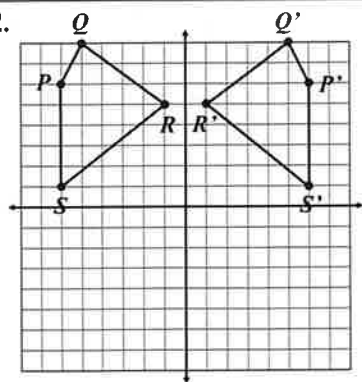
51. Triangle XYZ with vertices $X(0, 5)$, $Y(15, 10)$, and $Z(10, -5)$; dilation with scale factor $k = 4/5$



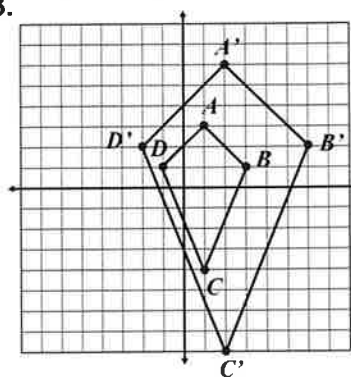
X' (____, ____)
 Y' (____, ____)
 Z' (____, ____)

Determine the type of transformation and write a rule.

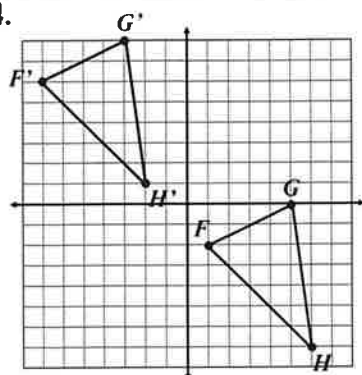
52.



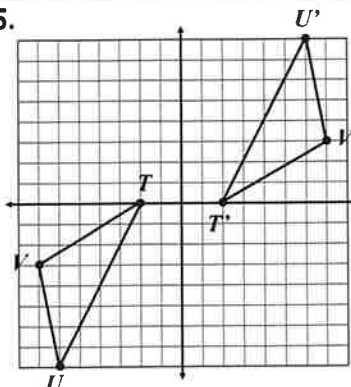
53.



54.



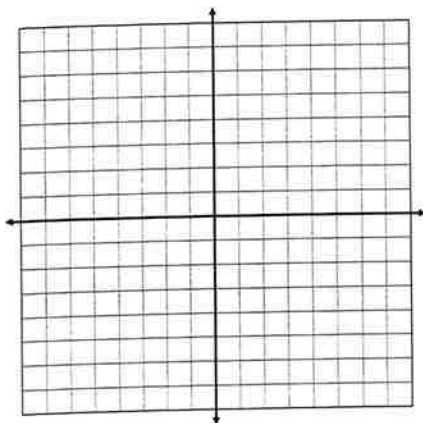
55.



TRANSFORMATIONS REVIEW

REFLECTIONS

1. Parallelogram $GHIJ$ with vertices $G(1, 5)$, $H(8, 7)$, $I(7, 3)$, and $J(0, 1)$; reflection in the y -axis.



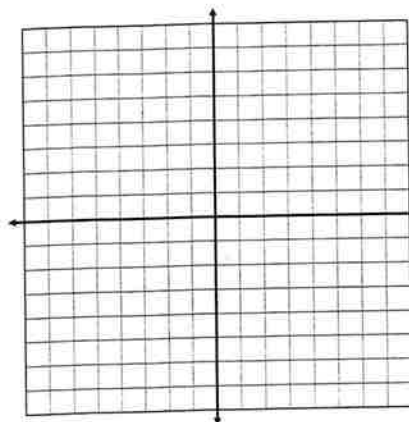
$G'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$H'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$I'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$J'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

2. Trapezoid $PQRS$ with vertices $P(-7, -2)$, $Q(-4, -1)$, $R(-2, -5)$, and $S(-8, -7)$; reflection in the x -axis.



$P'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

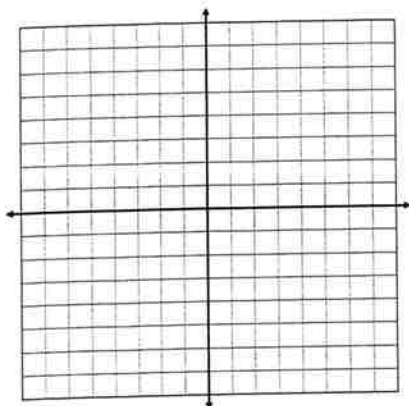
$Q'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$R'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$S'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

TRANSLATIONS

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

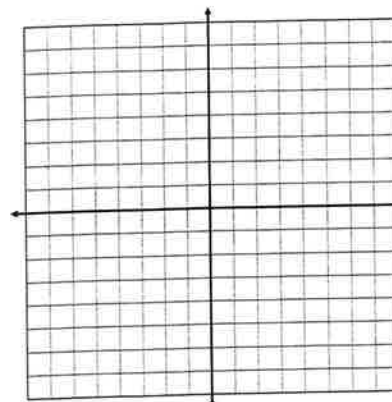


$B'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$C'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$D'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

4. Quadrilateral $MNOP$ with vertices $M(1, 6)$, $N(3, 4)$, $O(4, -1)$, and $P(-2, 3)$; translated along the rule $(x, y) \rightarrow (x - 3, y + 1)$



$M'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

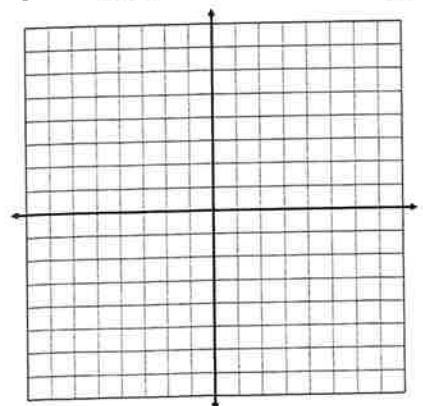
$N'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$O'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$P'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

ROTATIONS

5. Rectangle $WXYZ$ with vertices $W(-8, -4)$, $X(-2, -1)$, $Y(0, -5)$, and $Z(-6, -8)$; 270° counterclockwise rotation about the origin



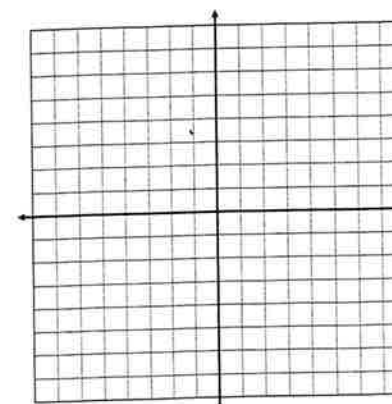
$W'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$X'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$Y'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$Z'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

6. Triangle RST with vertices $R(2, 6)$, $S(6, 7)$, and $T(8, 1)$; 180° rotation about the origin

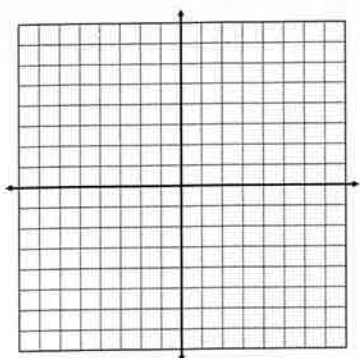


$R'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$S'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$T'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

7. Rhombus $ABCD$ with vertices $A(1, 0)$, $B(6, -2)$, $C(8, -7)$, and $D(3, -5)$; 90° counterclockwise rotation about the origin



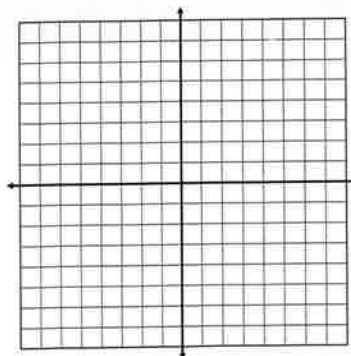
$A'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$B'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$C'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$D'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

8. Quadrilateral $STUV$ with vertices $S(-6, 5)$, $T(-4, 7)$, $U(-2, 1)$, and $V(-8, 1)$; 180° rotation about the origin



$S'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

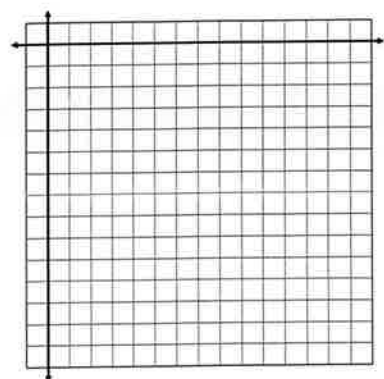
$T'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$U'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$V'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

DILATIONS

9. Triangle LMN with vertices $L(1, -2)$, $M(3, 0)$, and $N(2, -3)$; dilation with scale factor $k = 5$

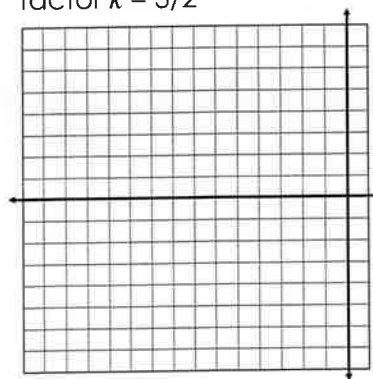


$L'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$M'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$N'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

10. Parallelogram $DEFG$ with vertices $D(-6, 2)$, $E(0, 4)$, $F(-2, 0)$, and $G(-8, -2)$; dilation with scale factor $k = 3/2$



$D'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

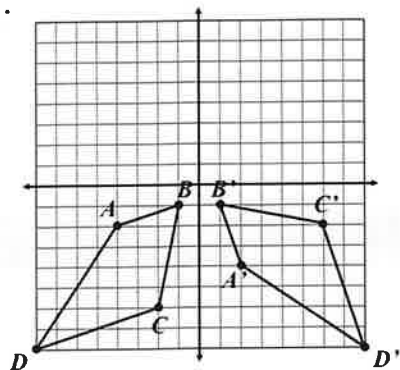
$E'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$F'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

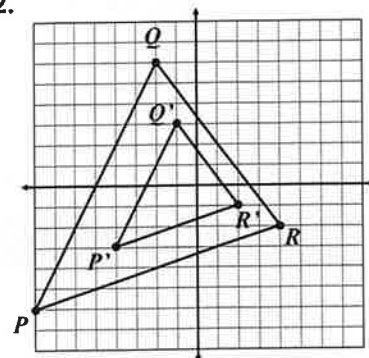
$G'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

NAME THAT TRANSFORMATION! (Write the rule, too!)

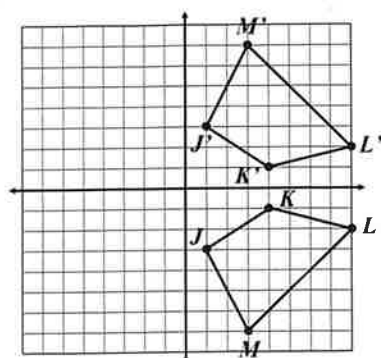
11.



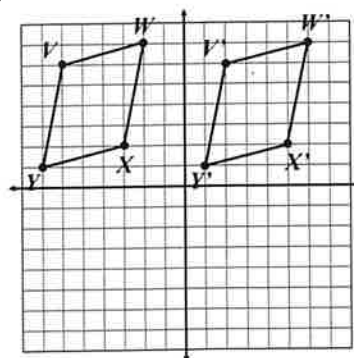
12.



13.



14.



Unit 8 Test Study Guide

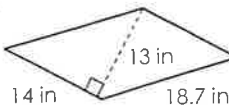
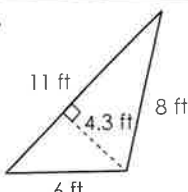
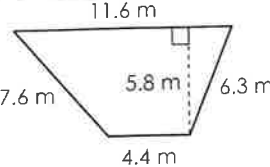
(Measurement: Area & Volume)

Name: _____

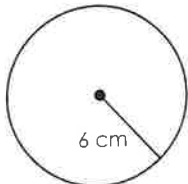
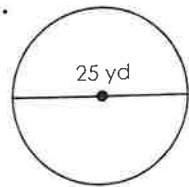
Date: _____ Per: _____

Topic 1: Area and Perimeter of Plane Figures

Find the perimeter and area of each figure.

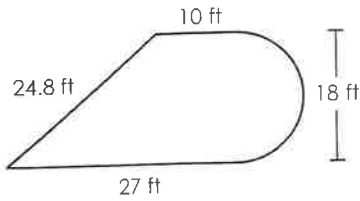
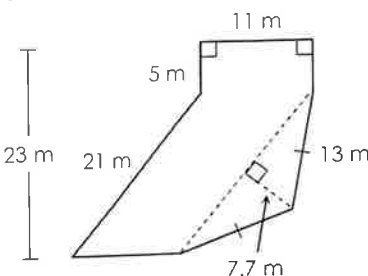
1. 		2. 		3. 			
Perimeter		Area		Perimeter		Area	

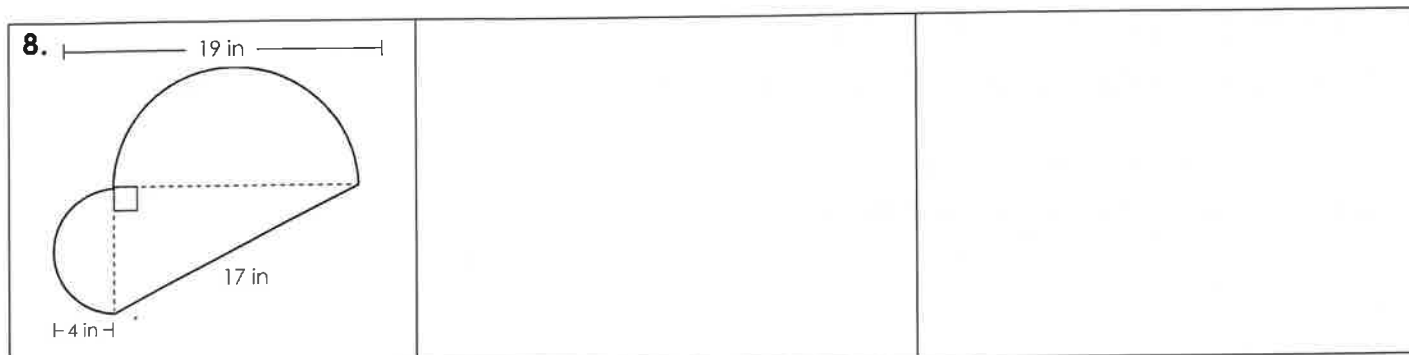
Find the circumference and area of each circle. Round to the nearest tenth.

Find the circumference and area of each circle.	
4. 	5. 
Circumference	Area

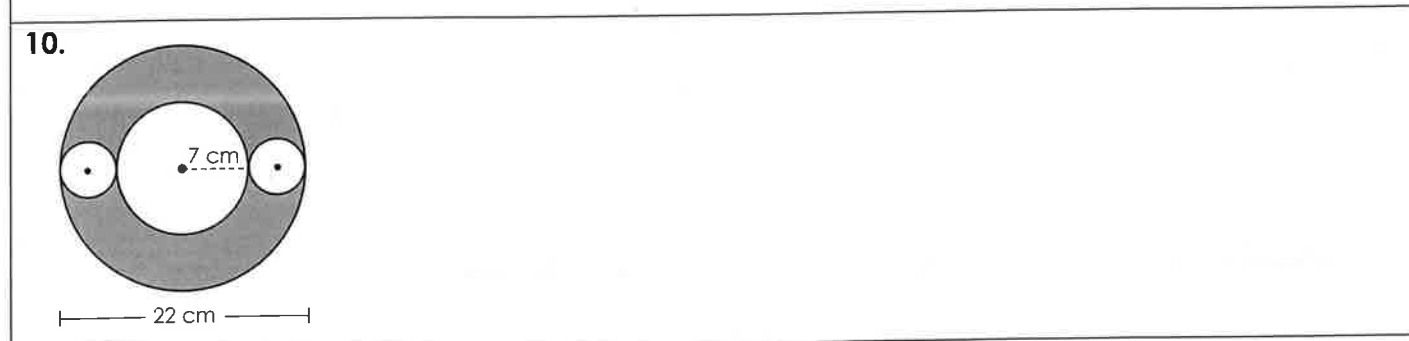
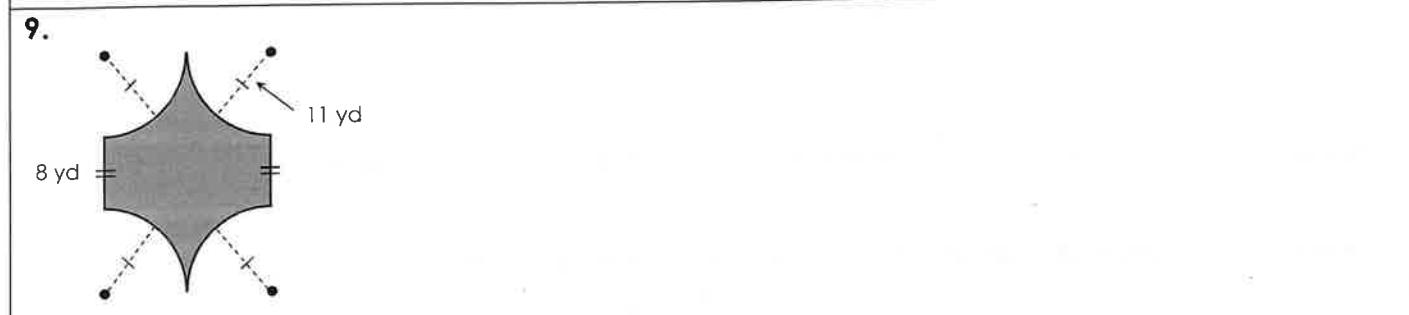
Topic 2: Area and Perimeter of Composite Figures

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

Figure	Perimeter	Area
6. 		
7. 		



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

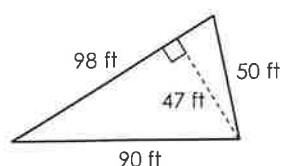


Topic 3: Area and Perimeter Applications

11. A trapezoid with a height of 14 meters has an area of 217 m^2 . If the length of one base is 12 meters, find the length of the other base.

12. Josh has a rectangular garden with an area of 324 square feet that he would like to enclose with a fence. If the garden has a length of 24 feet, how much fencing would he need?

13. Mr. Nelson is buying property in the shape of a triangle to build a new house. If the property costs \$42.50 per square foot, how much will he pay?

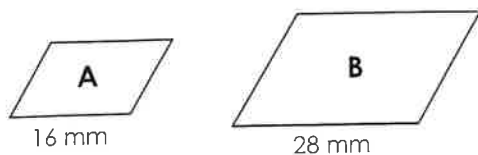


14. Find the circumference of a circle with an area of 615.75 square inches.

Topic 4: Area and Perimeter of Similar Figures

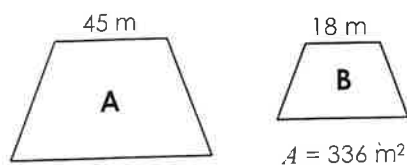
Assume each pair of figures below are similar.

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

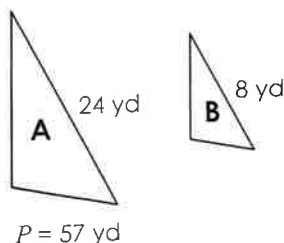


Scale Factor	Perimeter Ratio	Area Ratio
--------------	-----------------	------------

17. Find the area of Figure A.



16. Find the perimeter of Figure B.

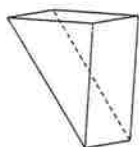


18. The area of Rectangle A is 108 km^2 and the area of Rectangle B is 192 km^2 . If the rectangles are similar and the length of Rectangle A is 15 km, find the length of Rectangle B.

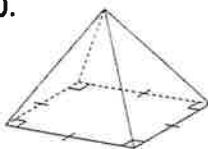
Topic 5: Classifying and Slicing 3D Figures

Classify the solid.

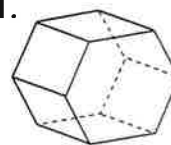
19.



20.

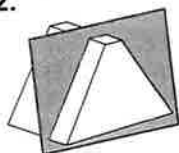


21.

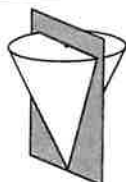


Draw and describe the cross section that results from each slice.

22.



23.



24.

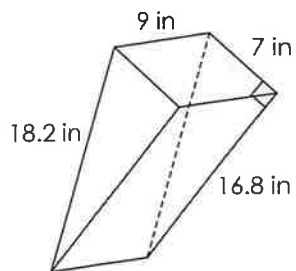


Topic 6: Volume and Surface Area

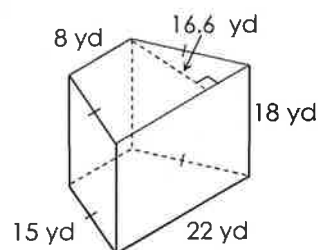
Find the volume and surface area of each solid. Round to the nearest tenth if necessary.

Figure	Volume	Surface Area
25.		

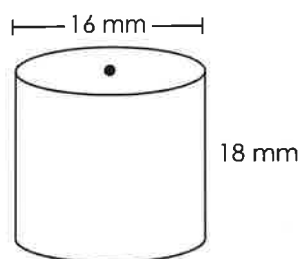
26.



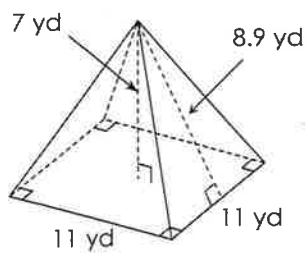
27.



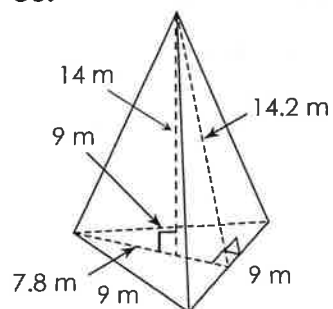
28.

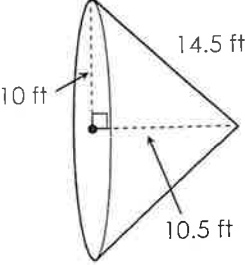
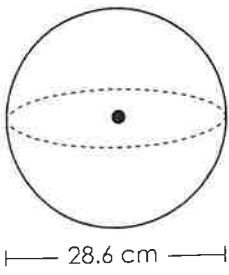


29.

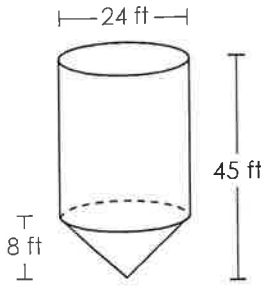
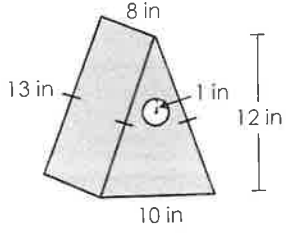


30.

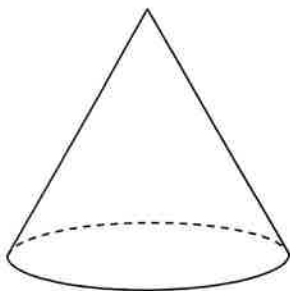


31. 		
32. 		

Topic 7: Volume and Surface Area Applications

33. A sugar silo is comprised of a cylinder and a cone. How much sugar can the silo hold? 	34. Erin is making a wooden birdhouse with the dimensions shown below. If she plans to paint the house, including its base, what is the total area that will be painted? 
35. Find the volume of a sphere with a surface area of 2,123.72 square meters.	36. A rectangular fish tank at the aquarium has a base that measures 24 feet by 12 feet and a height of 16 feet. The tank is being drained for cleaning at a rate of 480 cubic feet of water per hour. If the tank was originally $\frac{3}{4}$ full of water, how long will it take to fully drain?

Use the diagram below for questions 37-38.



$$V = 600 \text{ cm}^3$$

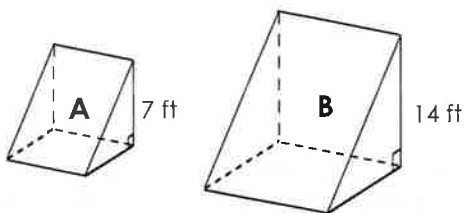
37. Describe the changes to the volume of the cone if the height is tripled, then find the new volume.

38. Describe the changes to the volume of the cone if the radius is multiplied by $\frac{1}{3}$, then find the new volume.

Topic 8: Volume and Surface Area of Similar Solids

Give the scale factor, surface area ratio, and volume ratio of Solid A to Solid B.

39.

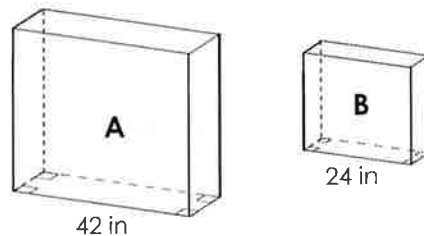


Scale Factor

Surface Area Ratio

Volume Ratio

40.

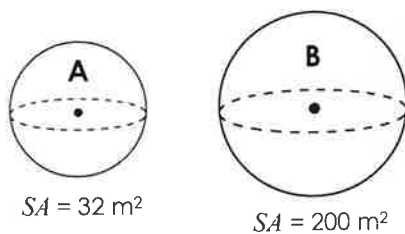


Scale Factor

Surface Area Ratio

Volume Ratio

41.

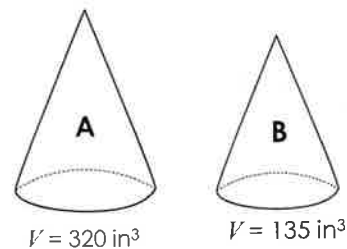


Scale Factor

Surface Area Ratio

Volume Ratio

42.



Scale Factor

Surface Area Ratio

Volume Ratio

43. The scale factor of Cylinder A to Cylinder B is 5:4. If the surface area of Cylinder A is 600 yd^2 , find the surface area of Cylinder B.

44. The volume of a pyramid is 275 ft^3 . If its dimensions are multiplied by four, what will be its new volume?

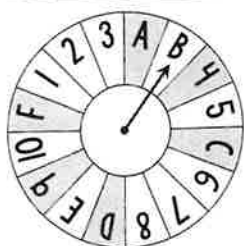
Unit 9 Test Study Guide (Probability & Statistics)

Name: _____

Date: _____ Per: _____

Topic 1: Simple Probability

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



a) $P(\text{shaded space})$

b) $P(\text{a number greater than 8})$

c) $P(\text{a multiple of 3 or a vowel})$

d) $P(\text{a perfect square})$

2. A card is drawn at random from a standard deck. What is the probability that it is a club or a red face card?

3. A soda pop company is running a bottle cap contest where "WINNER" is printed underneath random bottle caps. If the probability of getting a winning bottle cap is 6 in 40, what is the probability of not winning?

Topic 2: Theoretical vs. Experimental Probability

4. The 12-sided die to the right is rolled 75 times. The results are shown in the table.

Result	1	2	3	4	5	6	7	8	9	10	11	12
Frequency	4	7	10	2	9	3	5	4	4	12	7	8



a) What is the theoretical probability of the die landing on a prime number?

b) Based on this experiment, what is the probability of the die landing on a prime number?

c) Theoretically, if the die is rolled 400 times, how many times would you expect it to land on a number that is at least 5?

d) Based on this experiment, if the die is rolled 400 times, how many times would you expect it to land on a number that is at least 5?

Topic 3: Counting Principle

5. How many different outfits consisting of a pair of pants, a shirt, and a tie can be made from four pairs of pants, seven shirts, and five ties?

6. A two-story mall has seven entrances on the first floor. Inside, it has four escalators, nine sets of stairs, and two elevators for customers to travel between floors. If a customer is on the second floor, how many ways can they leave the mall?

7. A standard die is rolled twice, then a card is chosen at random from a standard deck. How many outcomes are possible?	8. A company gives each client a unique account number containing four letters followed by three digits. How many account numbers are possible?
--	---

Topic 4: Compound Probability

9. A Magic 8-Ball is an advice seeking and fortune-telling toy. After asking the ball a yes-no question, the user turns the ball upside down to reveal one of the following unique 20 answers. Answers with a white background are positive, answers with a light gray background are undecided, and answers with a dark gray background are negative.

It is certain	It is decidedly so	Without a doubt	Yes definitely
You may rely on it	As I see it, yes	Most likely	Outlook good
Yes	Signs point to yes	Reply hazy try again	Ask again later
Better not tell you now	Cannot predict now	Concentrate and ask again	Don't count on it
My reply is no	My sources say no	Outlook not so good	Very doubtful

If Tessa asks the Magic 8-ball two questions, find each probability:

a) $P(\text{positive both times})$	b) $P(\text{undecided both times})$
c) $P(\text{positive, then negative})$	d) $P(\text{"Don't count on it", then positive})$



10. If a die is rolled three times, what is the probability of getting a 2 on the first roll, an odd number on the second roll, and a number less than 5 on the third roll?

11. A pop-quiz contains five true or false questions. If Emily guesses, what is the probability that she gets all five correct?

12. A bag contains the letters of the word PENNSYLVANIA. A letter is drawn, replaced, then another is drawn. What is the probability that the first letter is an N or A and the second letter has a vertical line of symmetry?

13. The varsity baseball team has won 15 out of their last 16 games. The junior varsity team has won 6 out of their last 10 games. What is the probability that both teams win their next game?

14. A box contains 2 red crayons, 6 blue crayons, 5 green crayons, 9 yellow crayons, and 3 purple crayons. A crayon is drawn at random, not replaced, then another is drawn. Find each probability.

a) $P(\text{yellow, then green})$
b) $P(\text{both blue})$

Topic 5: Using Samples to Predict

15. A high school is conducting a survey to see how many students have part-time jobs. Determine whether the samples are biased or unbiased. Explain.

a) five random students in each homeroom

b) every 10th student that enters a school football game

c) 100 random students in the school parking lot

16. A bake shop surveyed a random group of customers to determine their favorite type of cheesecake. Results are shown below.

Cheesecake	Frequency
Strawberry	21
Red Velvet	16
Chocolate Fudge	28
Raspberry Truffle	12
Cookies & Cream	25
Peanut Butter Fudge	18

a) What percent reported Raspberry Truffle as their favorite?

b) What percent reported Red Velvet or Peanut Butter Fudge as their favorite?

c) Out of 800 people, how many would you expect to say their favorite cheesecake is Cookies & Cream?

Topic 6: Measures of Central Tendency & Range

Find the mean, median, mode(s), and range for each of the following data sets. Round to the nearest tenth if necessary.

17. The number of yards ran by a running back in each game of a season: {58, 59, 110, 70, 150, 140, 76, 85, 33, 103, 130, 27, 153, 128, 64}

18. The length of time, in minutes, it took each student in a class to complete a test: {42, 28, 31, 55, 42, 25, 48, 42, 36, 24, 36, 51, 58, 39, 30, 47}

Mean	Median	Mode(s)	Range	Mean	Median	Mode(s)	Range																					
19. Bella and Isaac take a weekly quiz in their math class. Their grades on each of the ten first quarter quizzes are shown below. Find the difference in their mean score. <table><thead><tr><th>Bella</th><th>Grade</th><th>Isaac</th></tr></thead><tbody><tr><td> </td><td>100</td><td> </td></tr><tr><td> </td><td>90</td><td> </td></tr><tr><td></td><td>80</td><td> </td></tr><tr><td> </td><td>70</td><td></td></tr><tr><td> </td><td>60</td><td></td></tr><tr><td></td><td>50</td><td> </td></tr></tbody></table>				Bella	Grade	Isaac		100			90			80			70			60			50		20. Rick ran 7.1 miles on Monday, 3.5 miles on Tuesday, 9 miles on Wednesday, and 5.8 miles on Thursday. How many miles does he need to run on Friday to average 6 miles per run?			
Bella	Grade	Isaac																										
	100																											
	90																											
	80																											
	70																											
	60																											
	50																											

Topic 7: Mean Absolute Deviation

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

- 21.** The age of each employee at a company:
{22, 52, 24, 29, 40, 58, 36, 32, 45, 39, 42, 25}

- 22.** The height, in feet, of five bridges in California:

Foresthill	730
Pine Valley Creek	440
Cold Spring Canyon	420
Bidwell Bar	627
Golden Gate	746

- 23.** Would the number of minutes of daylight each day for a month or the number of minutes of daylight each day for a year have a greater mean absolute deviation? Explain.

Topic 8: Box-and-Whisker Plots

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

- 24.** The number of boxes of cookies sold by each girl in a Girl Scout troop: {26, 32, 12, 27, 16, 38, 61, 28, 42, 30, 57, 24}



Minimum: _____

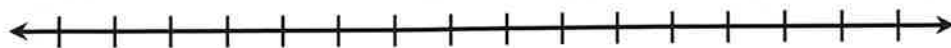
Lower Quartile: _____

Median: _____

Upper Quartile: _____

Maximum: _____

- 25.** The distance, in yards, of the last 15 field goals successfully made by a kicker: {50, 52, 53, 43, 31, 39, 50, 49, 40, 46, 57, 55, 50, 30, 46}



Minimum: _____

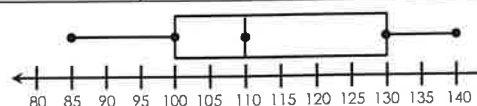
Lower Quartile: _____

Median: _____

Upper Quartile: _____

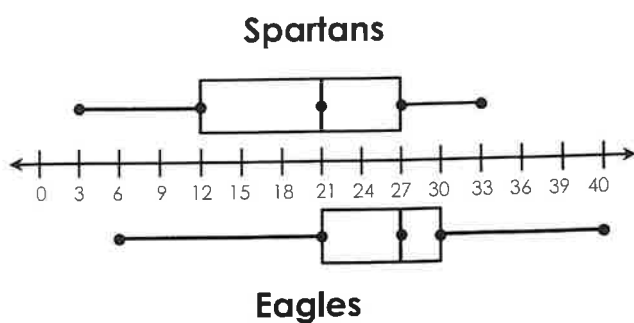
Maximum: _____

- 26.** The running time, in minutes, of 20 movies, each with a different running time, is shown to the right.



- What is the interquartile range? _____
- What percent of the movies are at least 130 minutes? _____
- What percent of the movies are between 100 and 140 minutes? _____
- How many movies are less than 110 minutes? _____
- How many movies are between 100 and 110 minutes? _____

27. The number of points scored by two football teams in each of their 12 games is shown below. Both teams scored a different number of points in each of their games.



a) Which team had a greater range?

b) What is the difference in their maximum score?

c) What is the total number of games that the Spartans and the Eagles scored at least 21 points?

Topic 9: Scatter Plots & Line of Best Fit

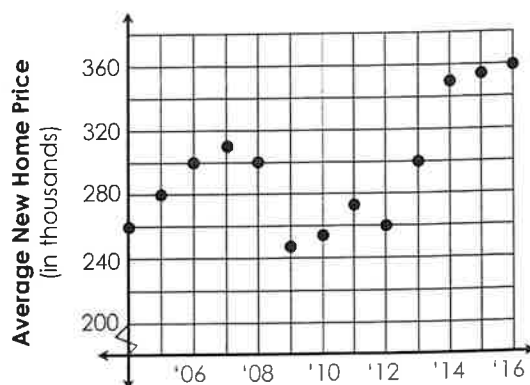
Determine whether the data would have a positive, negative, or no relationship.

28. The number of songs on an iPod versus its remaining storage.

29. The age of a car versus its odometer reading.

30. The height of a high school student versus their SAT score.

31. The graph below shows the average price of a new home in a certain city each year since 2004. Use the graph to answer the questions.

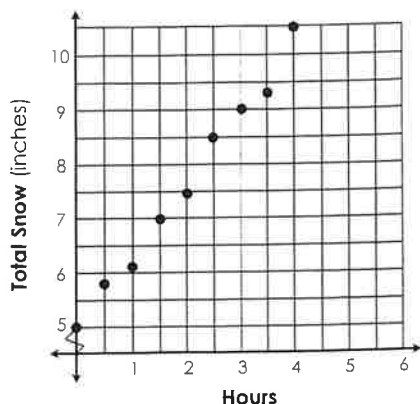


a) In what year(s) was the average new home price \$300,000?

b) What was the approximate average new home price in 2014?

c) Describe the change in the average new home price from 2008 to 2009.

32. Ashley measured the total snow in her yard every 30 minutes after a snowstorm started. The graph below shows her findings:



a) Which line best represents this data?

A) $y = -\frac{3}{4}x + 5$

C) $y = \frac{3}{4}x + 5$

B) $y = -\frac{4}{3}x + 5$

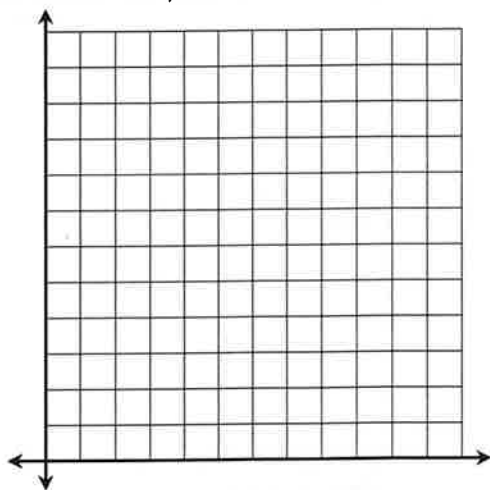
D) $y = \frac{4}{3}x + 5$

b) Using the line of best fit from part a, predict the total amount of snow after six hours.

33. The table below shows the temperature of a lake at certain depths.

Depth (ft)	0	8	18	25	30	36	40	47	55	60
Temperature ($^{\circ}F$)	84	81.5	79	76.5	75	73	72	70	67.5	66

a) Draw a scatter plot to show the relationship.

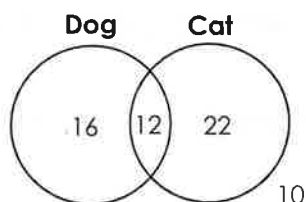


a) Write an equation for the line of best fit.

b) Estimate the temperature of the lake at 90 feet.

Topic 10: Two-Way Tables & Relative Frequency

34. The Venn diagram below shows the results of a survey in which a group of students were asked if they have a dog and if they have a cat. Complete the two-way table.



	Cat	No Cat	Total
Dog			
No Dog			
Total			

35. The partial table below shows the number of medals won in mens, womens, and mixed team events by the United States in the 2016 Summer Olympics. Complete the table, then answer the questions that follow.

	Gold	Silver	Bronze	Total
Men	18		19	55
Women		17		
Mixed	1		2	5
Total	46		38	

a) How many bronze medals did the United States win in women's events?

b) How many total medals were won?

36. Complete the relative frequency table using the data from question 35. Round to the nearest hundredth if necessary. Then answer the questions that follow.

	Gold	Silver	Bronze	Total
Men				
Women				
Mixed				
Total				

a) What percent of the medals won were in men's events?

b) What percent of the medals won were women's event gold medals?

Name: _____

Unit 10: Radicals

Date: _____ Bell: _____

Homework 1: Simplifying Radicals (Day 1)

**Directions:** Simplify the radicals below.

1. $\sqrt{324}$	2. $7\sqrt{81}$	3. $-5\sqrt{144}$
4. $\sqrt{200}$	5. $\sqrt{320}$	6. $\sqrt{245}$
7. $4\sqrt{108}$	8. $-2\sqrt{150}$	9. $6\sqrt{392}$
10. $4\sqrt{50}$	11. $8\sqrt{112}$	12. $\sqrt{567}$
13. $\sqrt[3]{216}$	14. $\sqrt[3]{54}$	15. $\sqrt[3]{-128}$
16. $\sqrt[3]{-72}$	17. $\sqrt[3]{686}$	18. $\sqrt[3]{-375}$

Name: _____

Unit 10: Radicals

Date: _____ Bell: _____

Homework 2: Simplifying Radicals (Day 2)

**Directions:** Simplify the radicals below.

1. $\sqrt{125x^2}$

2. $\sqrt{245u^4v^4}$

3. $-3\sqrt{100ab^6}$

4. $\sqrt{80a^2b^3c^3}$

5. $\sqrt{512p^9q^4r^{10}}$

6. $-2\sqrt{192x^{25}y^{18}}$

7. $-2\sqrt{108m^{13}n^8}$

8. $-8\sqrt{27x^{10}y^5z^{17}}$

9. $\sqrt[3]{27m^{12}}$

10. $4\sqrt[3]{-125x^{10}}$

11. $10\sqrt[3]{-24a^8b^2}$

12. $\sqrt[3]{189m^2n^{25}p^9}$

Name: _____

Unit 10: Radicals

Date: _____ Bell: _____

Homework 3: Adding/Subtracting Radicals**Directions:** Find each sum or difference. Write your answer in simplest radical form.

1. $\sqrt{2} + \sqrt{2}$

2. $-2\sqrt{18} + 2\sqrt{2}$

3. $-5\sqrt{243} - 3\sqrt{27}$

4. $\sqrt{500} + \sqrt{20} + 11\sqrt{5}$

5. $2\sqrt{45} + 2\sqrt{90} + 3\sqrt{45}$

6. $3\sqrt{54} + 3\sqrt{3} - 2\sqrt{384}$

7. $3\sqrt{7} + 2\sqrt{32} - 4\sqrt{175}$

8. $\sqrt{20} + 2\sqrt{80} + \sqrt{72} - \sqrt{5}$

9. $-3\sqrt{28} + 8\sqrt{3} - \sqrt{300} + 7\sqrt{112}$

10. $4\sqrt{24} - 2\sqrt{80} + 11\sqrt{6} - 3\sqrt{216}$

11. The perimeter of a triangle is $16\sqrt{7}$ feet. If two of the sides measure $\sqrt{343}$ feet and $\sqrt{175}$, find the length of the third side as a radical in simplest form.

Name: _____

Unit 10: Radicals

Date: _____ Bell: _____

Homework 4: Multiplying Radicals**** This is a 2-page document! ******Directions:** Find the product. Write your answer in simplest radical form.

1. $4\sqrt{6} \cdot \sqrt{15}$

2. $-8\sqrt{5} \cdot -2\sqrt{5}$

3. $2\sqrt{20} \cdot -4\sqrt{35}$

4. $-\sqrt{42} \cdot 4\sqrt{7}$

5. $\sqrt{8k} \cdot \sqrt{6k}$

6. $4\sqrt{10n^2} \cdot -3\sqrt{8n}$

7. $\sqrt{14r^2} \cdot \sqrt{6r^7}$

8. $-5\sqrt{2m^6} \cdot 2\sqrt{32m^2}$

9. $5\sqrt{98} - 3\sqrt{6} \cdot 5\sqrt{3}$

10. $\sqrt{8b^2} \cdot \sqrt{6b^2} + 3b^2\sqrt{3}$

Name: _____

Unit 10: Radicals

Date: _____ Bell: _____

Homework 5: Dividing Radicals (Day 1)

**** This is a 2-page document! ******Directions:** Find each quotient. Make sure your final answer is rationalized.

1. $\sqrt{\frac{8}{98}}$

2. $\frac{\sqrt{6}}{\sqrt{50}}$

3. $\frac{7\sqrt{60}}{\sqrt{3}}$

4. $\frac{8\sqrt{5}}{2\sqrt{36}}$

5. $\frac{5\sqrt{3}}{10\sqrt{27}}$

6. $\frac{8\sqrt{14}}{12\sqrt{18}}$

7. $\frac{6\sqrt{48}}{4\sqrt{6}}$

8. $\frac{16\sqrt{56}}{2\sqrt{2}}$

9. $\frac{2\sqrt{8}}{\sqrt{36}}$

10. $\frac{2\sqrt{15}}{6\sqrt{12}}$

11. $\frac{7\sqrt{15}}{5\sqrt{48}}$

12. $\frac{14\sqrt{30}}{4\sqrt{54}}$

Unit 10 Test Study Guide

(Radical Expressions & Equations)

Name: _____

Date: _____ Per: _____

Topic 1: Simplifying Radicals

Perfect Squares: _____

Perfect Cubes: _____

1. $5\sqrt{112}$	2. $-\sqrt{44a^7b^{16}}$	3. $2\sqrt{108x^9y^2z^{14}}$
4. $\sqrt[3]{189}$	5. $\sqrt[3]{-16a^4}$	6. $\sqrt[3]{320m^{15}n^7}$

Topic 2: Adding & Subtracting Radicals

7. $5\sqrt{7} + 2\sqrt{7}$	8. $\sqrt{72} - \sqrt{18}$
9. $4\sqrt{48} - \sqrt{147} - 3\sqrt{50}$	10. $3\sqrt{5} + 7\sqrt{125} - 2\sqrt{45}$

Topic 3: Multiplying Radicals

11. $5\sqrt{6} \cdot \sqrt{27}$	12. $7\sqrt{10} \cdot -3\sqrt{18}$	13. $\sqrt{5x^2} \cdot \sqrt{8x^3}$
---------------------------------	------------------------------------	-------------------------------------

14. $\sqrt{6}(7\sqrt{3}+6)$	15. $3\sqrt{2}(5\sqrt{10}-2\sqrt{6})$
16. $(5+2\sqrt{7})(4-\sqrt{7})$	17. $(1+2\sqrt{8})^2$

Topic 4: Dividing Radicals

18. $\sqrt{\frac{48}{3}}$	19. $\frac{\sqrt{18}}{\sqrt{75}}$	20. $\frac{6\sqrt{56}}{2\sqrt{63}}$
21. $\sqrt{\frac{12}{5}}$	22. $\frac{2}{6\sqrt{2}}$	23. $\frac{20\sqrt{8}}{4\sqrt{3}}$
24. ~~$\frac{5-\sqrt{3}}{\sqrt{12}}$~~	25. ~~$\frac{\sqrt{8}}{4+\sqrt{6}}$~~	