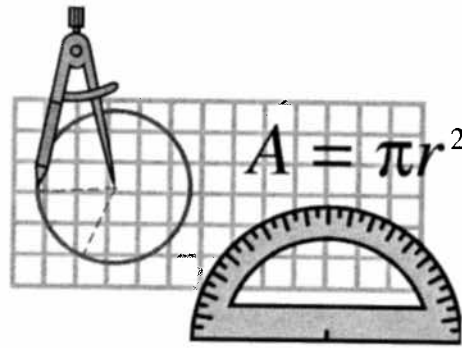


BRIEN MCMAHON HIGH SCHOOL
MATH DEPARTMENT



HONORS GEOMETRY
SUMMER PACKET
2011

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in Geometry. The topics covered in this packet should be mastered *before* entering Geometry. If topics have not been mastered, examples have been provided in each section.

The packet itself will not be assessed, but any areas of concern or difficulty will be addressed. The packet does not need to be printed out. The value of completing the packet is to keep your math skills sharp and fresh.

While it is not required, it is recommended that students buy a calculator for their personal use throughout the school year. A scientific calculator will be sufficient for Geometry, however a TI – 83 graphing calculator is recommended for Algebra 2 and beyond.

Name _____ Date _____

TOPIC 1: MENTAL MATH

NOTES:

Adding from left to right: Add the largest place values first and then work your way right, to the ones column.

Multiplying from left to right: Multiply the left most column and work your way to the ones column. Add the results.

EXAMPLES: Simplify the following problems using mental math (NO CALCULATOR).

A. $79 + 67$	
$70 + 60 = 130$	Add the tens column.
$9 + 7 = 16$	Add the ones column.
$130 + 16 = 146$	Add the results.

B. $124 \cdot 3$	
$100 \cdot 3 = 300$	Multiply the hundreds column by 3.
$20 \cdot 3 = 60$	Multiply the tens column by 3
$4 \cdot 3 = 12$	Multiply the ones column by 3.
$300 + 60 + 12 = 372$	Add the results.

PRACTICE PROBLEMS: Simplify the following problems using mental math (NO CALCULATOR).

a) $325 + 251$

b) $85 \cdot 6$

c) $3952 \cdot 2$

Answers: a) $500 + 70 + 6 = 576$ b) $480 + 30 = 510$ c) $6000 + 1800 + 100 + 4 = 7904$

TOPIC 3: PRIME FACTORIZATION

NOTES:

Prime Numbers: Prime numbers are numbers that are only divisible by 1 and themselves. For example, the only numbers that divide evenly into 7 are 1 and 7. The first few prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, and 29.....

Factors: A factor is a term that is part of another term when multiplied, or the numbers that are multiplied together to get another number.

Example: What are the factors of 15?
 $5 \cdot 3 = 15$ (3 and 5 are the factors of 15)

Prime Factorization: The prime numbers that are multiplied together to make the original number.

Example: What is the prime factorization of 20?
 $20 = 2 \cdot 2 \cdot 5 = 2^2 \cdot 5$

EXAMPLES: Find the prime factorization for each number.

A. 18	Start with the smallest prime number, 2 and check to see if 2 can divide 18.
$2(9)$	Working with the 9, check to see if 2 can divide 9. It cannot, so check if 3 (the next prime number) can divide 9.
$2 \cdot 3 \cdot 3$	It is not possible to divide further because 2 and 3 are both prime numbers.
$2 \cdot 3^2$	Write the final answer using exponents.

B. 350	Start with the smallest prime number, 2 and check to see if 2 can divide 350.
$2(175)$	Working with the 175, check to see if 2 can divide 175. It cannot, so check if the next prime number (3 or 5, etc.) can divide 175.
$2 \cdot 5(35)$	Working with the 35, check to see which of the next prime numbers can divide 35.
$2 \cdot 5 \cdot 5(7)$	It is not possible to divide further because 2, 5 and 7 are both prime numbers.
$2 \cdot 5^2 \cdot 7$	Write the final answer using exponents.

PRACTICE Problems Write the prime factorization for the numbers below.

a) 80

b) 42

c) 75

Answers: a) $2^4 \cdot 5$ b) $2 \cdot 3 \cdot 7$ c) $3 \cdot 5^2$

TOPIC 3: ORDER OF OPERATIONS

NOTES:

Order of Operations:

1. Parentheses
2. Exponents
3. Multiply or Divide
4. Addition or Subtraction

Grouping Symbols { [()] }	Exponents x^2	Multiply \times	Addition $+$
		Divide \div	Subtraction $-$



EXAMPLES: Simplify.

A. $-4^2 + 24 \div 3 \cdot 2$	There are no (), work with exponent first.
$-16 + 24 \div 3 \cdot 2$	Note that there are no grouping symbols. Therefore the exponent only applies to the "4" and not the "-".
$-16 + 8 \cdot 2$	Perform division because it appears first in the problem.
$-16 + 16$	Perform multiplication before addition
0	Perform addition

B. $4(25 - (5 - 2)^2)$	Work with inner most parentheses first.
$4(25 - (3)^2)$	Subtract inside inner most parentheses
$4(25 - 9)$	Continue with inner most parentheses, working with exponents.
$4(16)$	Continue with inner most parentheses, subtract.
64	Perform multiplication.

PRACTICE PROBLEMS: Simplify.

a) $\frac{5^2 - 1}{8 - (2)(3)}$

b) $9 - 3 \cdot 2^3$

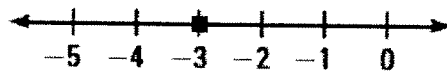
c) $-5^2 + 30 \div 5(4)$

Answers: a) 12 b) -15 c) -1

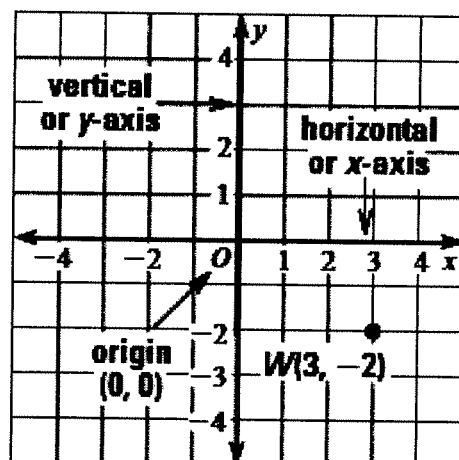
TOPIC4: PLOTTING POINTS

NOTES & EXAMPLES

In one dimension, plot the points on a number line. For example $x = -3$ would be represented by the following:



In two dimensions, plot the points on the coordinate plane. The coordinate plane is made-up of the horizontal x -axis and the vertical y -axis. Each point in the coordinate plane corresponds to an ordered pair of real numbers. For example, the ordered pair $W(3, -2)$, has an x -coordinate of 3 and a y -coordinate of -2. It would be represented by the following:



PRACTICE PROBLEMS: Put numbers on the number line and plot the following.

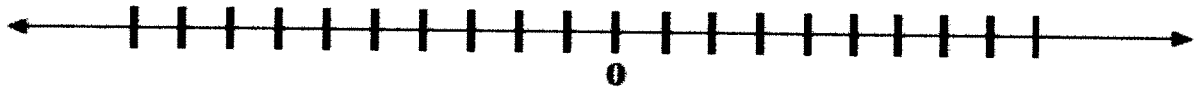
1) $x = -8$

2) $x = 4$

3) $x = 6.8$

4) $x = -1.5$

5) $x = \frac{3}{2}$



Plot the points on the graph and label them.

1) $A(4, 8)$

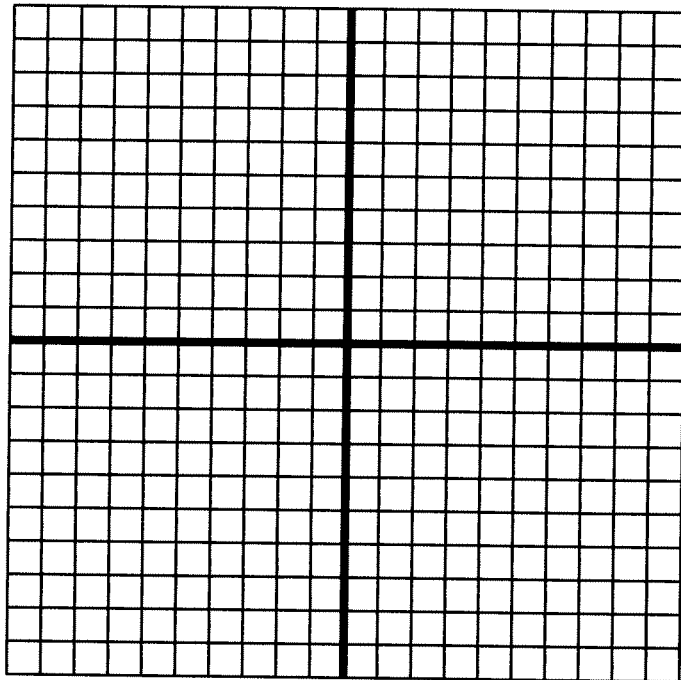
2) $B(-2, 10)$

3) $C(-4, -6)$

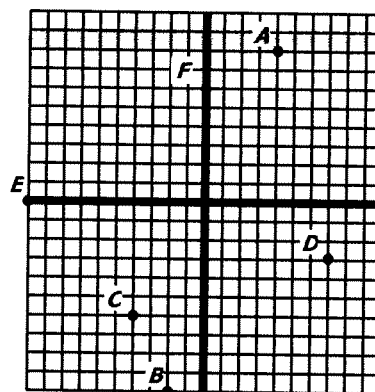
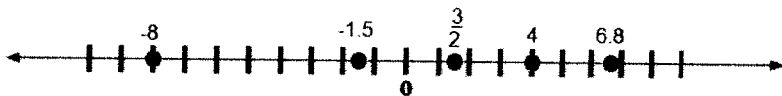
4) $D(7, -3)$

5) $E(-10, 0)$

6) $F(0, 6)$



Answers:



TOPIC 5: CONVERTING BETWEEN
FRACTIONS, DECIMALS & PERCENTS

NOTES & EXAMPLES

To convert a fraction into a decimal, divide the numerator by the denominator. $\frac{4}{5} = 4 \div 5 = 0.8$. When using a calculator to solve remember, "top divided by bottom".

To convert a decimal to a fraction is a bit more complicated. Any numbers to the left of the decimal point are whole numbers and are the large numbers in a mixed fraction. All numbers to the right are made into a fraction. Put a 1 in the denominator and a zero under every number in the numerator. Then simplify the fraction. For example: $4.625 = 4\frac{625}{1000} = 4\frac{5}{8}$. "1000" is in the denominator because it has three zeros to correspond to the three numbers in the numerator.

Percent means "per hundred." The symbol for percent is "%". To convert a decimal to a percent, move the decimal two places to the right. To convert a percent to a decimal, move the decimal two places to the left. Any percent can be written as a fraction with a denominator of 100.

$$0.4 \rightarrow 40\% \rightarrow \frac{40}{100}$$

$$0.0215 \rightarrow 2.15\% \rightarrow \frac{2.15}{100} \rightarrow \frac{215}{10000}$$

$$16\% \rightarrow 0.16 \text{ or } \frac{16}{100}$$

$$3.5\% \rightarrow 0.035 \text{ or } \frac{3.5}{100} \rightarrow \frac{35}{1000}$$

PRACTICE PROBLEMS: Convert the decimals to fractions and the fractions to decimals.

a) $\frac{5}{8}$

b) $\frac{8}{5}$

c) 0.14

d) 2.805

Convert the decimal to a percent and the percents to decimals.

e) 0.73

f) 0.6

g) 5%

h) 52%

Answers: a) 0.625 b) 1.6 c) $\frac{7}{50}$ d) $2\frac{16}{200}$ e) 73% f) 60% g) 0.05 h) 0.52

TOPIC 8: OPERATIONS WITH FRACTIONS

NOTES & EXAMPLES

- Adding or subtracting fractions: must have a common denominator; only perform operation with the numerator.

$\frac{14}{5} + \frac{1}{5}$	Denominators match, so only add numerator	$\frac{3}{5} - \frac{1}{4}$	Different denominators
$= \frac{15}{5}$	Reduce fraction if possible	$\frac{3(4)}{5(4)} - \frac{1(5)}{4(5)}$	Multiply each fraction to create common denominators
$= \frac{3}{1} = 3$	Leave answer in simplest form	$\frac{12}{20} - \frac{5}{20}$	When the denominators match, then add numerators
		$= \frac{7}{20}$	The fraction cannot be reduced, so cannot be simplified further

- Multiplication: multiply the numerators then multiply the denominators and reduce if possible.

$\frac{14}{5} \cdot \frac{1}{5}$	Multiply "straight across"	$\frac{7}{5} \cdot \frac{6}{4}$	Multiply "straight across"
		$\frac{(7)(6)}{(5)(4)}$	
$= \frac{14}{25}$	The fraction cannot be reduced, so cannot be simplified further	$\frac{42}{20}$	Reduce if possible
		$= \frac{21}{10} = 1\frac{9}{10}$	Leave final answer as improper fraction or a mixed number

- Division: Keep the first fraction as is, and multiply by the reciprocal of the second fraction. ("Keep, change, flip.")

$\frac{14}{5} \div \frac{1}{5}$	Keep the first fraction Change sign to multiply Flip over second fraction	$\frac{7}{5} \div \frac{6}{4}$	Keep the first fraction Change sign to multiply Flip over second fraction
$= \frac{14}{5} \cdot \frac{5}{1}$	Multiply across	$\frac{7}{5} \cdot \frac{4}{6}$	Multiply across
$= \frac{70}{5}$	Reduce if possible	$\frac{28}{30}$	Reduce if possible
$= \frac{14}{1} = 14$	Leave answer in simplest form	$= \frac{14}{15}$	Leave answer in simplest form

PRACTICE PROBLEMS: Simplify.

a) $\frac{2}{3} + \frac{3}{5}$

b) $\frac{3}{4} \cdot \frac{8}{11}$

c) $\frac{3}{9} - \frac{4}{3}$

d) $\frac{1}{5} \div \frac{2}{3}$

Answers: a) $1\frac{19}{15} = 1\frac{3}{5}$ b) $\frac{24}{44} = \frac{6}{11}$ c) -1 d) $\frac{3}{10}$

TOPIC 9: PROPORTIONS

NOTES & EXAMPLES

Ratio: A comparison of two quantities. Ratios are generally written in three forms:

$$\frac{a}{b} \qquad a \text{ to } b \qquad a:b$$

Proportion: An equation that sets two ratios equal to each other: $\frac{a}{b} = \frac{c}{d}$. When using a proportion to solve a word problem, it is important that the units in the problem are aligned horizontally or vertically. Cross multiply to solve a proportion: $ad = bc$.

A. $\frac{1}{6} = \frac{x}{9}$	Cross multiply.
$6x = (1)(9)$	Simplify.
$6x = 9$	Solve for x.
$x = 1.5$	

B. Paola is planning a trip to Europe. If the exchange rate is \$1 US = 0.70 Euros, how many Euros can Paola get for \$650?	Set-up the proportion. Notice the dollars are both in the numerator and the Euros are both in the denominator.
$\frac{1}{0.70} = \frac{650}{x}$	Cross multiply.
$(1)x = 650(0.70)$	Solve for x.
$x = 455$	The answer is 455 Euros

PRACTICE PROBLEMS

a) $\frac{8}{x} = \frac{30}{42}$

b) Alex bought 5 tomatoes for \$1.40. How much will 36 tomatoes cost?

Answers: a) $x = 11.2$ b) \$10.08

TOPIC 8: OPERATIONS WITH PERCENTAGES

NOTES & EXAMPLES:

Problems involving percentages generally follow the formula: (WHOLE) · (%) = PART. When using the formula, write the % using either the decimal or fraction equivalent. This formula can also be written as a proportion in the form: $\frac{\%}{100} = \frac{part}{whole}$. When using the proportion, the percent is left as a whole number.

A. 30 is what percent of 50?	Set-up the equation above.
$50 \cdot x = 30$	Solve for x.
$x = 0.60 = 60\%$	The answer is the decimal equivalent of 60%

B. 90 is 15% of what number?	Set-up the equation above.
$x \cdot 0.15 = 90$	Solve for x.
$x = 600$	The whole number is 600.

Percentages can be applied to problems involving tax and discounts problems. In such problems, the general formula is: (ORIGINAL SALE PRICE) · (%) = (TAX OR DISCOUNT), or as a proportion: $\frac{\%}{100} = \frac{tax / discount}{original\$ \$ \$}$. In tax problems, the answer is added to the original price and in discount problems the answer is subtracted from the original price.

C. How much will someone pay for a shirt that has a sale price of \$25 and is discounted 10%?	Set-up the equation above.
$25 \cdot 0.10 = x$	Solve for x.
$2.5 = x$	Since this is a discount, subtract.
$25.00 - 2.50 = \$22.50$	The discounted price is \$22.50

Percentages are also used to describe change over in time, as a percent increase or decrease. In such problems the formula is: (ORIGINAL QUANTITY) · (% CHANGE) = (QUANTITY CHANGE) or $\frac{\%}{100} = \frac{change}{original}$ (Note that a change in quantity is calculated using the formula: new quantity – original quantity.)

D. A car is currently worth \$12,000. Five years ago the car was worth \$17,000. What is the percent change in the value of the car.	Calculate the quantity change. Note, that the \$12,000 is the new quantity and the \$17,000 is the original quantity.
$12,000 - 17,000 = -5,000$	Set-up the equation.
$(17,000)x = -5,000$	Solve for x.
$x \approx -0.29 \rightarrow 29\% \text{ decrease}$	The negative answer indicates a percent decrease.

E. A piece of jewelry Amanda bought has increased in value by 20%. If she bought the jewelry for \$65, what is it now worth?	Set-up the equation.
$(65)0.20 = x$	Solve for x.
$13 = x$	This represents the change in price.
$65 + 13 = \$78$	Since this is a % increase, add the change to the original price.

PRACTICE PROBLEMS: Solve the word problem. Show all work.

a) There are 36 students on the football team. On a certain day only 29 showed up for practice. What percent of the team was at practice?

b) A computer was bought in 2005 for \$950. It has since decreased in value by 45%. What is the current value of the computer?

Answers: a) 73% b) 60% c) 0.05 d) 0.52 e) 80.56% f) \$522.50

TOPIC 9: SOLVING EQUATIONS

NOTES:

Follow the guideline below to help solve equations. The equation is solved when x is isolated. Check your answer.

FIRST: distribute if applicable to remove parentheses

SECOND: combine like terms of variables and constants on the **same** side of the equation

THIRD: if there are variables on both sides of the equation, bring them to one side by adding or subtracting

FOURTH: undo addition or subtraction

FIFTH: undo division or multiplication

(Remember, $\frac{x}{5}$ means "x divided by 5. To clear a fraction, multiply by its reciprocal).

EXAMPLES: Solve for x.

$$\begin{array}{r}
 7(x-3) = 8x+2 \\
 7x-21 = 8x+2 \quad \text{Distribute.} \\
 \underline{-7x = -7x} \quad \text{Subtract } 7x. \\
 -21 = x+2 \quad \text{Simplify.} \\
 \underline{-2 = -2} \quad \text{Subtract 2.} \\
 -23 = x \quad \text{Simplify.}
 \end{array}$$

$$\begin{array}{r}
 x^2 - 2 = 34 \\
 \underline{+2 = +2} \quad \text{Add 2.} \\
 x^2 = 36 \quad \text{Simplify.} \\
 \sqrt{x^2} = \sqrt{36} \quad \text{Square Root} \\
 x = \pm 6
 \end{array}$$

$$\begin{array}{r}
 \frac{5}{6}x = 10 \quad \text{Add multiply by the} \\
 \frac{6}{5} \cdot \frac{5}{6}x = 10 \cdot \frac{6}{5} \quad \text{reciprocal.} \\
 x = 12 \\
 \text{Simplify.}
 \end{array}$$

PRACTICE PROBLEMS: Solve for x.

a) $6x=100-19x$

b) $3(2y-3)=27$

c) $\frac{3}{4}x=27$

Answers: a) $x=4$ b) $x=6$ c) $x=36$

TOPIC 10: WORKING WITH FORMULAS
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NOTES & EXAMPLES:

A formula is an algebraic equation that relates two or more real-life quantities. Solve a formula by plugging in all the known variables and solving for the unknown.

Circumference of a Circle: $C = 2\pi r$; $C =$ Circumference; $r =$ radius; $\pi = 3.14$ Find the radius if $C = 100$ in	
$100 = 2(3.14)r$	Plug in all known values.
$(100) = 6.28r$	Multiply to simplify.
$\frac{100}{6.28} = \frac{6.28r}{6.28}$	Divide both sides by 6.28.
$15.92 = r$	The height is 15 units.

PRACTICE PROBLEMS:

a) Area of a triangle: $A = \frac{1}{2}bh$; $b =$ length of base; $h =$ height of triangle. Find height if $A = 40$; $b = 16$.

b) Perimeter of a Square: $P = 4s$; $s =$ length of side. Find side length if $P = 68$.

Answers: a) $h = 5$ b) $s = 17$

TOPIC II: LINEAR EQUATIONS WORD PROBLEMS

NOTES & EXAMPLES:

When solving a word problem, the unknown is "x". Create an equation to model the situation and then solve.

Write an equation to help you solve the word problems. Define the variable. Show all work.

- A.** A new cellphone plan charges \$35 for unlimited calls each month, but charges \$0.08 for every text message sent. If Paul's bill was \$85.16, how many text messages did he send?

$x = \# \text{ of texts sent}$	Define the variable. Since the # of texts is unknown, x represents the # of texts.
$35 + 0.08x = 85.16$	Set-up an equation. \$35 is the starting price of the plan. "x" is multiplied by 0.08 because the charge is \$0.08 for every text. The total cost of the plan for the month is \$85.16.
$x = 627$	Solve.
Paul sent 627 texts.	Use the answer to find the solution to the word problem.

- B.** Joe's age is one year less than four times Malik's age. Together their ages total 34. How old is Malik?

$x = \text{Malik's age}$ Joe's age: $4x - 1$	Define the variable. Since Malik's age is unknown, x represents Malik's age. Joe's age is equal to four times Malik's age, minus one year.
$4x - 1 + x = 34$	Set-up an equation. Add the two ages together and set them equal to 34.
$x = 7$	Solve.
Malik is 7 years old.	Use the answer to find the solution to the word problem.

PRACTICE PROBLEMS:

- a) Alison has budgeted \$1800 to spend on chairs for his new restaurant. He found a company that charges \$70 per chair, but he has to pay \$610 for shipping. How many chairs can he purchase?
- b) Ralph has one more than three times the number of bus tokens that Sam has. Together they have 45 tokens. How many tokens does Ralph have?

Answers: a) 17 chairs b) 34 tokens

TOPIC 12: SYSTEMS OF EQUATIONS

NOTES:

A system of equations is a set of two or more equations that use the same set of variables. Systems can be solved by graphing or using the algebraic methods of substitution or elimination. Systems can have one solution, no solution or many solutions. The point or points shared by the equations is the solution.

EXAMPLES:

Solve the system by substitution

A. $\begin{cases} y = 3x - 4 \\ y = -2x + 1 \end{cases}$		B. $\begin{cases} y = 5x - 1 \\ -2x + 3y = 23 \end{cases}$	
$3x - 4 = -2x + 1$	Since both equations equal y , substitute one for y .	$-2x + 3(5x - 1) = 23$	Substitute the y in the second equation with $5x - 1$
$x = 1$	Solve for x .	$x = 2$	Solve for x .
$y = 3(1) - 4 = -1$	To find y , substitute 1 into one of the equations for x	$y = 5(2) - 1 = 9$	To find y , substitute 2 into one of the equations for x
$(1, -1)$	Write the answer as a point	$(2, 9)$	Write the answer as a point

PRACTICE PROBLEMS:

a) $\begin{cases} y = 5x - 4 \\ y = x + 16 \end{cases}$

b) $\begin{cases} x = 7 - y \\ 2x + 3y = 17 \end{cases}$

Answers: a) (5, 21) b) (3, 4)

TOPIC 13: EXPONENTS

NOTES & EXAMPLES:

An expression like 5^3 is called a power. The exponent 3 represents the number of times the base 5 is used as a factor: $5^3 = 5 \cdot 5 \cdot 5$ (3 as a factor of 5). To simplify expressions involving exponents, you often use properties of exponents. Let a and b be numbers and let m and n be integers.

Rules of Exponents		Examples
• Adding/Subtracting	$a^m + a^m = 2a^m$	$5x^3 + 3x^3 - 4x^2 = 8x^3 - 4x^2$
• Product of Powers Property	$a^m \cdot a^n = a^{m+n}$	$4^2 \cdot 4^7 = 4^{2+7} = 4^9$
• Zero Power Property	If $a \neq 0$, then $a^0 = 1$	$(5x^3)^0 = 1$

PRACTICE PROBLEMS: Simplify.

a) $\frac{6x^7y^5}{3x^2}$

b) $(3a^2)(4a^6b)$

c) $(8h^5j^3k)^0$

Answers: a) $2x^5y^5$ b) $12a^8b$ c) 1

TOPIC 6: RADICALS

NOTES & EXAMPLES

If $a^2 = b$, then b is the square root of a . If x represents any positive real number, then the expression \sqrt{x} is the positive square root of x . It is the *positive* number we square to get x . The expression $-\sqrt{x}$ is the negative square root of x . It is the negative number we square to get x . For example, The positive square root of 25 is 5 and can be written $\sqrt{25} = 5$. The negative square root of 25 is -5 and can be written $-\sqrt{25} = -5$. Zero has just one square root: $\sqrt{0} = 0$. Negative numbers do not have a square root; $\sqrt{-25} = \emptyset$ (no solution in the real numbers). Some square roots are decimals: $\sqrt{46} \approx 6.78$.

PRACTICE PROBLEMS: Simplify.

a) $\sqrt{121}$

b) $\sqrt{45}$

c) $\sqrt{-36}$

Answers: a) 11 b) ≈ 6.71 c) \emptyset

Name _____ Date _____

*****PROBLEM SETS TO BE TURNED IN*****

PROBLEM SET FOR TOPIC 1: MENTAL MATH

Simplify the following problems using mental math (NO CALCULATOR).

1) $672+142$ 2) $48+13$ 3) $350+225$ 4) $87+14$ 5) $455+82$

6) $40 \cdot 7$ 7) $562 \cdot 5$ 8) $341 \cdot 9$ 9) $37 \cdot 4$ 10) $753 \cdot 3$

PROBLEM SET FOR TOPIC 2: PRIME FACTORIZATION

State the prime factorization of the following numbers.

1) 300 2) 76 3) 450 4) 60 5) 48

6) 363 7) 448 8) 1000 9) 98 10) 891

PROBLEM SET FOR TOPIC 3: ORDER OF OPERATIONS

Simplify using the order of operations. .

1) $6+3(4)$ 2) $6+7 \cdot 10$ 3) $(2)(8) \cdot (3)(5)$

4) $17 - [4 + 2 \cdot 3]$

5) $32 - [5(30 \div 5) + 1] + 7$

6) $50 - 2(16 - 2 \cdot 6)^2$

7) $5 + [4 \cdot 3(2 + 1)]$

8) $\left[\frac{6 \cdot 2(8 - 3)}{11 + 4} \right] \cdot 6$

9) $8 \left(\frac{6 + 24}{3 + 2 \cdot 6} \right)^3$

- 10) Mrs. Smith, a 7th grade math teacher puts the following problem on the board: $9 - 2(3)$. Joe says the answer is 21, but Alex says the answer is 3. Who is correct and why?

PROBLEM SET FOR TOPIC 4: PLOTTING POINTS

PROBLEM SET: Put numbers on the number line and plot the following.

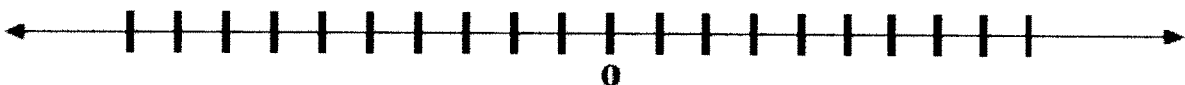
6) $x = -4$

7) $x = 3$

8) $x = 3.5$

9) $x = -0.5$

10) $x = \frac{5}{2}$



PROBLEM SET: Plot the following points on the coordinate plane.

7) (4,8)

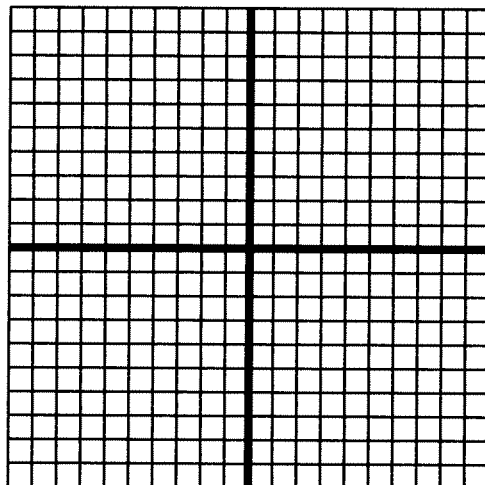
8) (-2,10)

9) (-4,-6)

10) (7,-3)

11) (-10,0)

12) (0,6)



PROBLEM SET FOR TOPIC 5: CONVERTING BETWEEN DECIMALS, FRACTIONS AND PERCENTS

Convert the fractions to decimals and the decimals to fractions.

a) $\frac{4}{10}$

b) $\frac{10}{4}$

c) $\frac{4}{3}$

d) $\frac{45}{86}$

e) 2.75

f) 0.7

g) 4.375

h) 0.0001

Convert the percents to decimals and the decimals to percents.

1) 0.73

2) 0.6

3) 5%

4) 52%

5) 4%

6) 134%

7) 0.134

8) 2.5

PROBLEM SET FOR TOPIC 6: OPERATIONS WITH FRACTIONS

Simplify.

1) $\frac{4}{5} - \frac{1}{5}$

2) $\frac{2}{3} \cdot \frac{3}{7}$

3) $\frac{9}{2} \div \frac{1}{2}$

4) $\frac{5}{8} + \frac{4}{5}$

5) $\frac{1}{4} + \frac{4}{5}$

6) $\frac{7}{8} - \frac{4}{11}$

7) $\frac{5}{12} \cdot \frac{9}{20}$

8) $\frac{15}{26} \div \frac{13}{5}$

PROBLEM SET FOR TOPIC 7: PROPORTIONS

Solve each problem by showing work or explaining your answer.

- 1) You are riding a bicycle it takes you 28 minutes to go 8 miles. If you continue traveling at the same rate, how long will it take you to go 15 miles?

- 2) If 6 pounds of tomatoes cost \$10.80, how much will 5 pounds cost?

- 3) The ratio of red to blue M&M's in a jar is 5:7. If there are 108 M&M's in the jar, how many are red?

- 4) The ratio of an object's weight on Earth to its weight on Mars is 5 to 2. How much would a man, who weighs 145 pounds on Earth, weigh on Mars?

PROBLEM SET FOR TOPIC 9: SOLVING EQUATIONS

Solve for x . Show all work. (Some answers may be decimals).

1) $12 + x = 5$

2) $-2 = 7 - x$

3) $12 = -3x$

4) $9x - 1 = 44$

5) $2x - 6 = 4x - 14$

6) $5x - 2 - 3 = 25$

7) $2x + 7 + 8x = -5 + 18$

8) $\frac{4}{5}x = 8$

9) $\frac{1}{3}x - 4 = 7$

10) $3(x + 7) - 2x = 23$

11) $0.25x - 0.35 = 1.15$

$$12) \frac{1}{4}x + 2 = -\frac{2}{3}$$

$$13) 8x = 6x - 20$$

$$14) x^2 = 49$$

$$15) x^2 + 4 = 40$$

$$16) \frac{x}{8} = \frac{20}{32}$$

$$17) \frac{5}{9} = \frac{12}{x}$$

$$18) \frac{x}{8} = \frac{x+1}{6}$$

$$19) \frac{10}{x-2} = \frac{5}{3}$$

PROBLEM SET FOR TOPIC 10: WORKING WITH FORMULAS
--

Find the missing value. Show all work.

- 1) Area of a Rectangle: $A = lw$; l = length of base; w = width of rectangle. Find Area if $w = 13$; $l = 5$

2) Circumference of a Circle: $C = 2\pi r$; $\pi = 3.14$; $r =$ radius. Find radius if $C = 62.8$

3) Perimeter of a Rectangle: $P = 2(l + w)$; $l =$ length of rectangle; $w =$ width of rectangle. Find length if $P = 28$; $w = 6$.

4) Area of a square: $A = s^2$; $s =$ side length. Find side if $A = 64$.

5) A microwave cooking guide includes a formula for the temperature of liquid after it is heated in the microwave on high. The guide indicated the formula is:

$T =$ the new temperature $\frac{7}{6} =$ the rate of heating (degrees per second)

$S =$ the # of seconds $I =$ the initial temperature of the liquid

$$T = \frac{7}{6}S + I$$

What is the initial temperature of a liquid that is heated on high for 30 seconds and has a new temperature of 95 degrees?

PROBLEM SET FOR TOPIC II: LINEAR EQUATIONS AND WORD PROBLEMS

Solve the word problems by showing all work.

- 1) Mario bought a book for \$9 and 5 magazines. All together he spent \$24.50. How much was the cost of one magazine?

2) Ralph weighs 282 pounds. If he loses 6 pounds a week, how long will it take him to get down to 204 pounds?

3) Mary is three times older than Seth is. If their ages total 76, how old is Mary?

PROBLEM SET FOR TOPIC 12: SYSTEMS OF EQUATIONS
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Solve the system of equations by using substitution.

1)
$$\begin{cases} y = 4x + 3 \\ y = 2x - 8 \end{cases}$$

2)
$$\begin{cases} y = 9x - 5 \\ y = -6x + 25 \end{cases}$$

Solution: _____

Solution: _____

3)
$$\begin{cases} x + y = 4 \\ y = 2x + 1 \end{cases}$$

4)
$$\begin{cases} x + y = 2 \\ x + 2y = 16 \end{cases}$$

Solution: _____

Solution: _____

PROBLEM SET FOR TOPIC 13: SYSTEMS OF EQUATIONS
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PROBLEM SET: Simplify the expression using rules of exponents.

1) $4x^2 + 3x - 6x - 2$

2) $(3x)(2x)$

3) $x^3 - 6x^2 - 7 - 4x^3 - x + 7$

4) $(8x^2 - 3x + 11) - (2x^2 - 5x - 4)$

5) $(9x^2y^3 + 4x^3y^2 - 2x^2y^2) - (6x^3y^2 - 2x^2y^3)$

6) $3x^2 \cdot 3x^2$

7) $x^6y^2 \cdot x^3yz^8 \cdot 4yz$

8) $(3a^4b^3)^0 + a^2b^3$

PROBLEM SET FOR TOPIC 14: RADICALS

Simplify.

1) $\sqrt{50}$

2) $\sqrt{81}$

3) $\sqrt{0}$

4) $\sqrt{-49}$

PROBLEM SET FOR TOPIC 15: LENGTH OF SEGMENT

PROBLEM SET: Use a ruler to find the length of each segment in inches and in centimeters.



in _____ cm: _____



in _____ cm: _____



in _____ cm: _____



in _____ cm: _____