

## Part 1      Algebra

**Directions: Show your work for all problems on these pages.**

A completed hard copy (work done in pencil) of this packet is due on the first day of school. Be prepared for an assessment of this material the first week of school after your teacher goes over it with you.

<p>1. Evaluate:</p> <p>a) <math>-2^4 =</math> _____      b) <math>(-2)^4 =</math> _____</p> <p>.</p>	<p>3. Solve for the variables:</p> <p>a) <math>-4k + 2(5k - 6) = -3k - 39</math></p> <p>b) <math>3(x + 4) = 3x + 11</math></p> <p>c) <math>10 + x = 5(\frac{1}{5}x + 2)</math></p> <p>d) <math>-\frac{11}{2} = -2\frac{1}{3} + 3\frac{1}{6}k</math></p> <p>e) <math>3 - 4(2n - 5) = 71</math></p>
<p>2. Evaluate the expression for the given values for the variables:</p> <p>a) <math>6h^2 \div 2 + h</math> when <math>h = -2</math></p> <p>b) <math>x^3 + 4</math> when <math>x = -5</math></p> <p>c) <math>x^3 + 5y</math> when <math>x = 4</math> and <math>y = -3</math></p> <p>d) <math>\frac{y - 7x}{6x + xy}</math> when <math>x = -2</math> and <math>y = 3</math></p> <p>e) <math>x - \frac{8y}{3}</math> when <math>x = \frac{1}{2}</math> and <math>y = -\frac{9}{8}</math></p>	

4. Solve the system using elimination:  $\begin{cases} 3x + 2y = 8 \\ 4x - 3y = -12 \end{cases}$   $x = \underline{\hspace{2cm}}$   $y = \underline{\hspace{2cm}}$

5. Solve the system using substitution:  $\begin{cases} y = 2x - 8 \\ 2x + 4y = 28 \end{cases}$   $x = \underline{\hspace{2cm}}$   $y = \underline{\hspace{2cm}}$

6. Solve the system using any method:  $\begin{cases} 6x - 3y = 12 \\ -4x + 2y = -8 \end{cases}$   $x = \underline{\hspace{2cm}}$   $y = \underline{\hspace{2cm}}$

7. Re-writing Formulas. Solve the formula for the indicated variable:

a)  $w$ ;  $P = 2l + 2w$

example:  $x$ ;  $\frac{1}{2}x + y = 6$   
 $2(\frac{1}{2}x + y) = (6)2$   
 $x + 2y = 12$   
 $\frac{-2y}{-2y} \quad \frac{-2y}{-2y}$   
 $x = -2y + 1$

b)  $b$ ;  $y = mx + b$

c)  $h$ ;  $V = \frac{1}{3}\pi r^2 h$

d)  $^{\circ}\text{C}$ ;  $^{\circ}\text{F} = \left(\frac{9}{5}\right)^{\circ}\text{C} + 32$

8. Write the equation of a line ( $y = mx + b$ ) that passes through the points  $(-1, -2)$  and  $(2, 7)$ . Hint: Find the slope, then find the y-intercept using one set of the points given.

9. Write an equation of a line that passes through the point  $(1, -5)$  and is **perpendicular** to  $y = \frac{1}{8}x + 2$ .

10. Write an equation of a line that passes through the point  $(2, -1)$  and is **parallel** to  $y - 2 = -\frac{2}{5}(x + 1)$ .

11. Write an equation of the line that passes through  $(5, 4)$  and has a slope of  $-3$ . Start with point-slope form  $(y - y_1) = m(x - x_1)$ .

12. Solve the absolute value function for the variables:

a)  $|12 + 2x| = 6$        $x = \underline{\hspace{2cm}}$  or  $x = \underline{\hspace{2cm}}$

example:  $|x + 8| - 5 = 2$

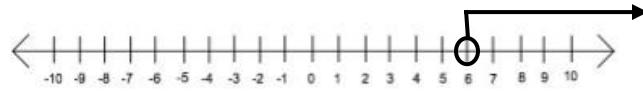
$$\begin{array}{rcl} & +5 & +5 \\ |x + 8| & = 7 \\ x + 8 & = 7 & \text{or} & x + 8 = -7 \\ -8 & -8 & & -8 & -8 \\ \hline & x = -1 & \text{or} & x = -15 \end{array}$$

b)  $|5y - 8| = 1$        $y = \underline{\hspace{2cm}}$  or  $y = \underline{\hspace{2cm}}$

13. Solve and graph the solution set:

An open circle (○) indicates "less than" or "greater than" while a closed circle (●) indicates "greater than or equal to" or "less than or equal to".

Example:  $8r + 6 < 9r$   
 $-8r \quad -8r$   
 $6 < r$   
 $r > 6$



a)  $3x + 2 > 11$



b)  $x + 3 \leq 5$



c)  $-2x - 10 < -12$



14. Solve the inequalities and compound inequalities for the variable:

a)  $2(x - 4) > 4x + 6$

b)  $21x + 7 < 3x + 16$

c)  $2 < 3x - 1 \leq 6$

d)  $2 + 3x < -13 \text{ or } 4 + 2x > 7$

## 15. Exponent Rules Review

NOTE: Anything to the zero power equals 1!

Product Rule: When multiplying monomials that have the same base, add the exponents.

$$x^m \cdot x^n = x^{m+n}$$

Example 1:  $x \cdot x^3 \cdot x^4 = x^{1+3+4} = x^8$

Power Rule: When raising monomials to powers, multiply the exponents.

$$(x^m)^n = x^{m \cdot n}$$

Example 3:  $(x^2 y^3)^4 = x^{2 \cdot 4} y^{3 \cdot 4} = x^8 y^{12}$

Quotient Rule: When dividing monomials that have the same base, subtract the exponents.

$$\frac{x^m}{x^n} = x^{m-n}$$

Example 5:  $\frac{x^3}{x^{-2}} = x^{3-(-2)} = x^5$

a)  $\frac{b \cdot a^2}{a^3 b^2}$

b)  $(x^2 y^3 z)^7$

c)  $\frac{m^6}{m^7}$

d)  $(6x^4 y^6)^3$

e)  $\frac{9a^3 b^5}{-3ab^8}$

f)  $\left(\frac{3m^2 n^7}{m}\right)^5$

g)  $6x^5 \cdot 3x^5 \cdot x^0$

h)  $\frac{x^{-1}}{4x^4}$

## 16. Simplify each expression (Hint: look for perfect squares) Leave in simplest radical form - NO DECIMALS:

a)  $\sqrt{512}$

b)  $-5\sqrt{294}$

c)  $6\sqrt{144}$

$$\begin{array}{c}
 6\sqrt{125} \\
 \swarrow \quad \searrow \\
 6 \cdot \sqrt{25} \sqrt{5} \\
 \swarrow \quad \searrow \\
 6 \cdot 5 \sqrt{5} \\
 \downarrow \\
 30\sqrt{5}
 \end{array}$$

d)  $\sqrt{29} \cdot \sqrt{29}$

e)  $\sqrt{8} \cdot \sqrt{6}$

f)  $\sqrt{216v^4}$

17. Rationalize the denominator (no radicals in the denominator) **Leave in simplest radical form – NO DECIMALS:**

$$a) \frac{2}{\sqrt{3}}$$

example:  $\frac{2\sqrt{3}}{\sqrt{2}} \rightarrow \frac{2\sqrt{3} \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{2\sqrt{6}}{\sqrt{4}} = \frac{2\sqrt{6}}{2} = \sqrt{6}$

b)  $\sqrt{\frac{3}{4}}$

$$c) \quad \frac{\sqrt{3}}{6\sqrt{7}}$$

d)  $\frac{\sqrt{5}}{\sqrt{2}}$

e)  $\frac{3\sqrt{30}}{5\sqrt{6}}$

f)  $\frac{\sqrt{2}}{2+\sqrt{3}}$

$$h) \quad \frac{5}{-3-4\sqrt{7}}$$

18. Factor the following (Hint: Do they have a common factor that can be factored out first – GCF)

a)  $x^2 - 4x - 5$

b)  $9y^2 - 16$

example:  $6n^2 - 18n + 12$   
 multiply to +2  
 → -2 & -1

What two factors multiply to +2  
and add to -3 → -2 & -1

GCF = 6 so  
divide out 6  
from each  
term in the  
expression

c)  $30p^2 + 25p - 20$

d)  $x^2 - 14x + 49$

e)  $8x^3 - 64$

19. Solve the quadratic function by the square root method. Leave the answer in **simplified radical form** if applicable.

a)  $x^2 - 64 = 0$

b)  $-4x^2 + 84 = 4$

c)  $7x^2 = -21$

d)  $9(2m - 3)^2 + 8 = 449$

e)  $(6t + 2)^2 + 4 = 28$

20. Linear Word Problems: Show all work. Solve for the variables.

a) Write an algebraic model representing the problem. Then solve.

The length of a rectangle is twice that of the width. The perimeter of the rectangle is 24 cm. What is the width of the rectangle?

model \_\_\_\_\_

b) Define the variables and write the system of equations.

A park charges \$10 for adults and \$5 for kids. How many adult tickets and kid tickets were sold, if a total of 548 tickets were sold for a total of \$3750?

21. Graphing Linear Equations:

a)  $2x + 3y = 6$

i. State the  $x$  and  $y$  intercepts:  $x = \underline{\hspace{2cm}}$   $y = \underline{\hspace{2cm}}$

ii. Solve the equation for  $y$ :  $\underline{\hspace{2cm}}$

iii. Graph the equation on the coordinate plane:

iv. State the slope and the  $y$ -intercept of this line.

Slope =  $\underline{\hspace{2cm}}$   $y$ -intercept =  $\underline{\hspace{2cm}}$

b)  $x - 3 = 0$  (Hint: VUX)

c)  $y + 4 = 0$  (Hint: HOY)

i. Graph line b) in red and line c) in blue

ii. State the slope of the line b): slope =  $\underline{\hspace{2cm}}$

line c): slope =  $\underline{\hspace{2cm}}$

d)  $3x - \frac{1}{2}y = 2$

i. Graph the equation on the coordinate plane:

ii. State the slope and the  $y$ -intercept of this line.

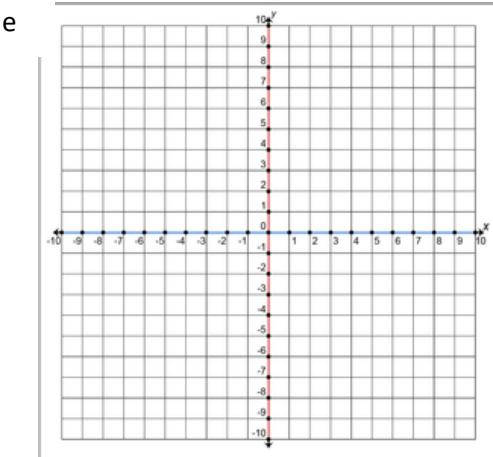
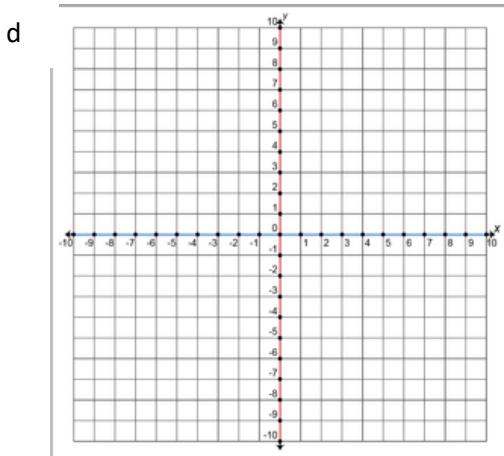
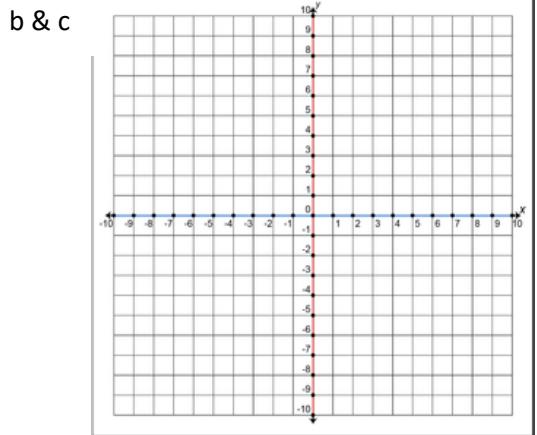
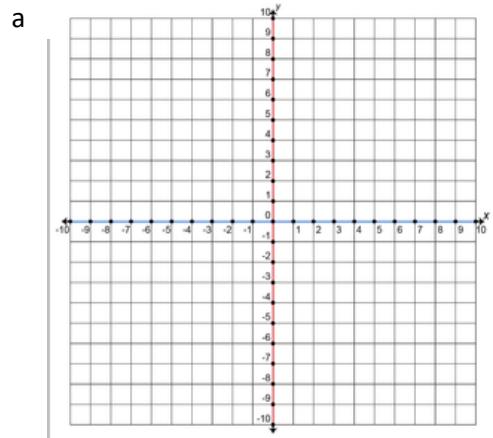
Slope =  $\underline{\hspace{2cm}}$   $y$ -intercept =  $\underline{\hspace{2cm}}$

e)  $6x + 24 = -12y$

i. Graph the equation on the coordinate plane:

ii. State the slope and the  $y$ -intercept of this line.

Slope =  $\underline{\hspace{2cm}}$   $y$ -intercept =  $\underline{\hspace{2cm}}$



## Part 2      Geometry and Trigonometry

**Directions: Show your work for all problems on these pages.**

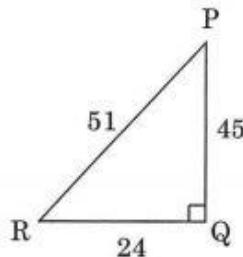
A completed hard copy (work done in pencil) of this packet is due on the first day of school. Be prepared for an assessment of this material the first week of school after your teacher goes over it with you.

1. Use  $\triangle PQR$  to determine the trig ratios below. Remember to simplify all fractions.

a.  $\sin P$

b.  $\cos P$

c.  $\tan P$



2. Find the value of each ratio. Round your answers to the nearest ten thousandth place (4 places past the decimal).

a.  $\cos 52^\circ$

b.  $\sin 72^\circ$

c.  $\tan 48^\circ$

3. Find the measure of each angle to the nearest whole degree.

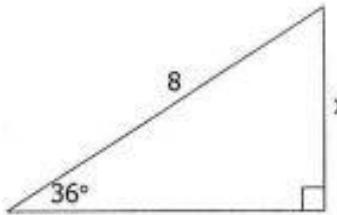
a.  $\sin A = 0.7245$

b.  $\tan C = 9.4618$

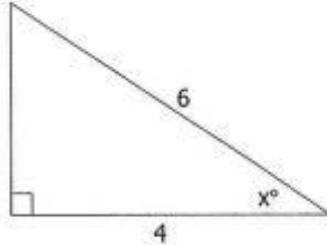
c.  $\cos E = .1212$

For problems #4-9, solve for  $x$ . Round sides to the nearest tenths place and angles to the nearest whole degree.

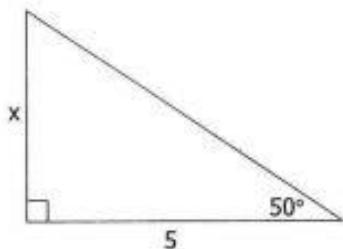
4.



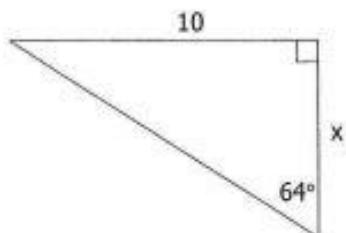
5.



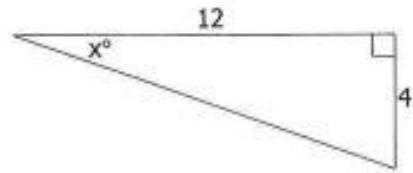
6.



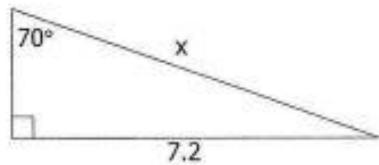
7.



8.

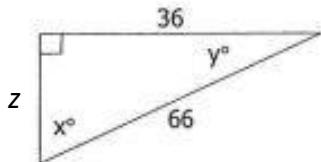


9.



For problems #10 & 11, solve for  $x$ ,  $y$ , and  $z$ . Remember to round sides to the nearest tenths place and angles to the nearest whole degree.

10.

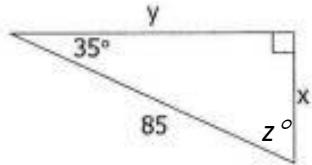


$$x^\circ =$$

$$y^\circ =$$

$$z =$$

11.

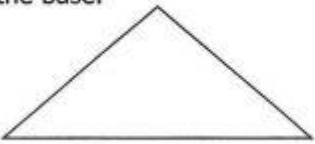


$$x =$$

$$y =$$

$$z^\circ =$$

12. The altitude of an isosceles triangle is 15 cm. If the vertex angle is  $64^\circ$ , find the length of the base.



Solve the following word problems. Remember to round sides to the nearest tenths place and angles to the nearest degree.  
**(Hint: Draw a picture to help you solve the problems below.)**

13. How tall is a tree if it casts a shadow of 50 *feet* and the rays of the sun meet the ground at a  $25^\circ$  angle?

14. A boy flying a kite lets out 100 *feet* of string, making an angle of elevation of  $40^\circ$ . How high above the ground is the kite?

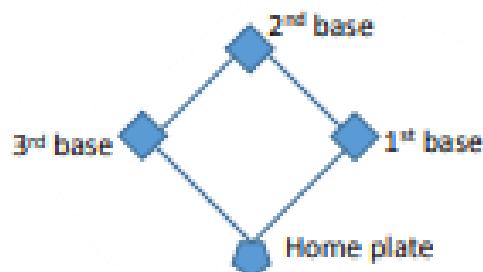
15. As viewed from a cliff 360 *m* above sea level, the angle of depression to a ship is  $28^\circ$ . How far is the ship from the shore?

16. The angle of elevation from a ship to the top of a lighthouse is  $3^\circ$ . If the ship is 1,000 *km* from the lighthouse, how tall is the lighthouse?

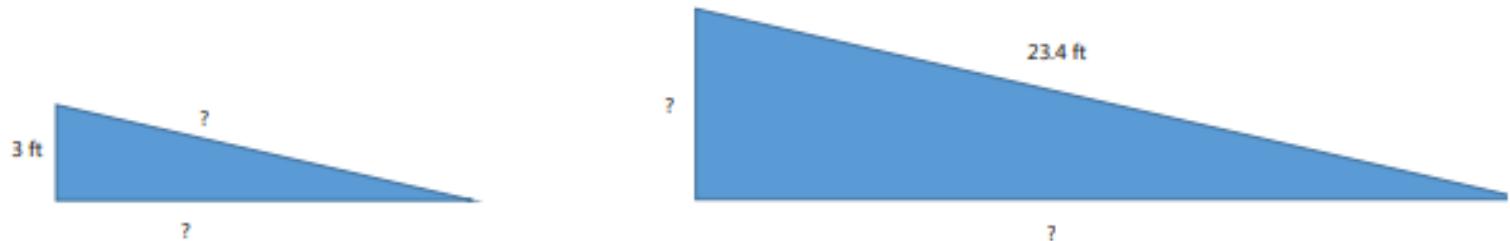
17. A person 150 *feet* away from the base of a building is measuring the height of a statue at the top of the building. The angle of elevation to the base of the statue is  $28^\circ$ , and the angle of elevation to the top of the statue is  $31^\circ$ . What is the height of the statue?

18. A surveyor is standing 100 meters from a bridge. She determines that the angle of elevation to the top of the bridge is  $35^\circ$ . If her height is 2.5 meters tall, then what is the height of the bridge?

19. A baseball diamond has four right angles and four equal sides. Each side is 90 *feet*. What is the shortest distance between home plate and second base? Round your answer to the nearest tenth.



20. For entrances to be accessible to all, ramps are being put in place in two different buildings. One will be smaller than the other, however, both ramps must be proportional in a 3:1 ratio. Two measurements are provided below. What are the measurements of the other sides?



21. Lorena and Karla are creating an art project in the shape of a right triangle. They have a 92 cm long piece of wood, which is to be used for the hypotenuse. The two legs of the triangular support are of **equal length**. Approximately how many more centimeters of wood do they need to complete the support.