Algebra 2 H 2022 Summer Packet

Name _____

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

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

1. Evaluate:

   a) $-2^4 =$ _____ b) $(-2)^4 =$ _____

2. Evaluate the expression for the given values for the variables:

   a) $6h^2 \div 2 + h \ \ when \ \ h = -2$

   b) $x^3 + 4 \quad when \ \ x = -5$

   c) $x^3 + 5y \quad when \ \ x = 4 \ and \ y = -3$

   d) $\frac{y - 7x}{6x + xy} \quad when \ x = -2 \ and \ y = 3$

   e) $x - \frac{8y}{3} \quad when \ x = \frac{1}{2} \ and \ y = -\frac{9}{8}$

3. Solve for the variables:

   a) $-4k + 2(5k - 6) = -3k - 39$

   b) $3(x + 4) = 3x + 11$

   c) $10 + x = 5(\frac{1}{5}x + 2)$

   d) $-\frac{11}{2} = -2\frac{1}{3} + 3\frac{1}{6}k$

   e) $3 - 4(2n - 5) = 71$

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

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

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

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

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

example: x; $\frac{1}{2}x + y = 6$

$2(\frac{1}{2}x + y) = (6)2$

$x + 2y = 12$

$-2y \quad -2y$

$x = -2y + 1$

b) b; $y = mx + b$

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

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

8. Write the equation of a line 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.

12. Solve the absolute value function for the variables:

a) $|12+2x|=6$ $x=$ _____ *or* $x=$ _____

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

$+5 \quad +5$

$|x+8|=7$

$x+8=7$ *or* $x+8=-7$

$-8 \quad -8 \qquad -8 \quad -8$

$x=-1$ *or* $x=-15$

b) $|5y-8|=1$ y= _____ *or* y= _____

13. Solve and graph the solution set:

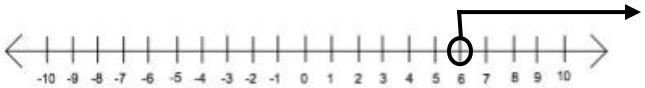
An open circle (○) indicates "less than" or "greater than" while a closed circle (●) indicates "greater than or equal to" or "less than or equal to".

Example: $8r + 6 < 9r$

$-8r \quad -8r$

$6 < r$

$\boxed{r > 6}$



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) $2 + 3x < -13 \; or \; 4 + 2x > 7$

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: $(x^2y^3)^4 = x^{2\cdot4}y^{3\cdot4} = x^8y^{12}$

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

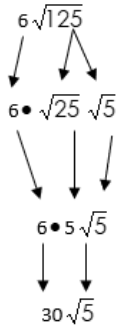
$\frac{x^m}{x^n} = x^{m-n}$ Example 5: $\frac{x^3}{x^{-2}} = x^{3-(-2)} = x^5$

a) $\frac{b \cdot a^2}{a^3 b^2}$ b) $(x^2y^3z)^7$ c) $\frac{m^6}{m^7}$ d) $(6x^4y^6)^3$

e) $\frac{9a^3b^5}{-3ab^8}$ f) $\left(\frac{3m^2n^7}{m}\right)^5$ 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) $6\sqrt{144}$



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

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

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

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

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

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

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

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: $6n^2 - 18n + 12$

$\div 6 \quad \div 6 \quad \div 6$

$6\ (n^2 - 3n + 2)$

$6\ (n-2)(n-1)$

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 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: $x =$ _____ $y =$ _____

ii. Solve the equation for *y*: _____

iii. Graph the equation on the coordinate plane:

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

Slope = _____ y-intercept = _____

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 = _____

line c): slope = _____

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 = _____ y-intercept = _____

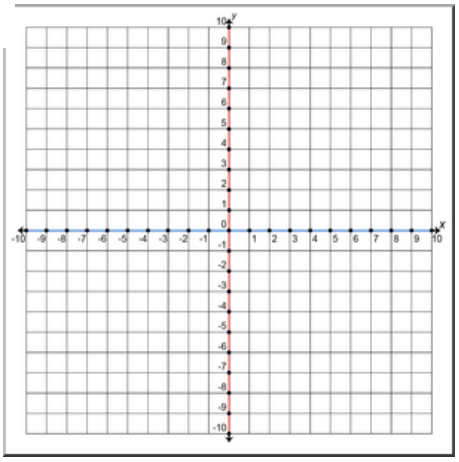
e) $6x + 24 = -12y$

i. Graph the equation on the coordinate plane:

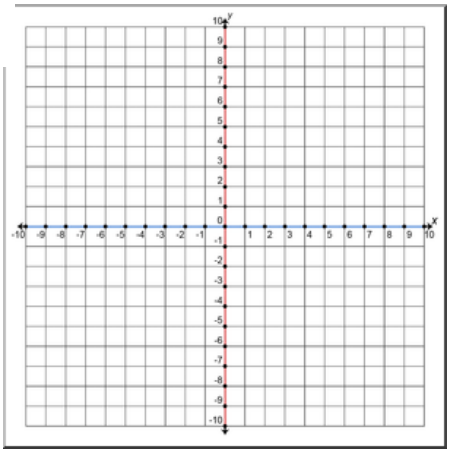
ii. State the slope and the y-intercept of this line.

Slope = _____ y-intercept = _____

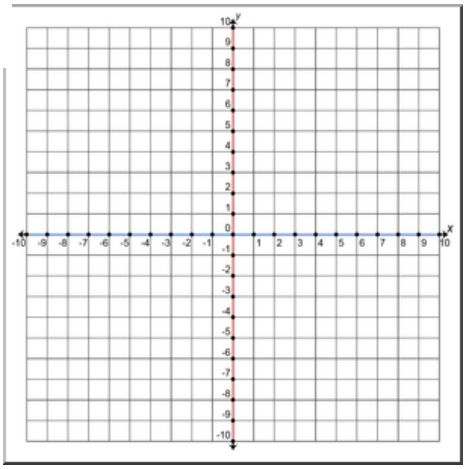
a



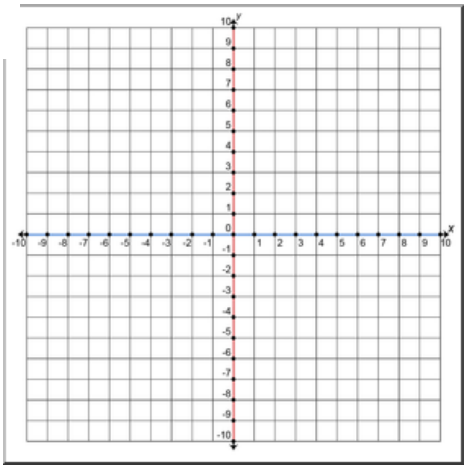
b & c



d

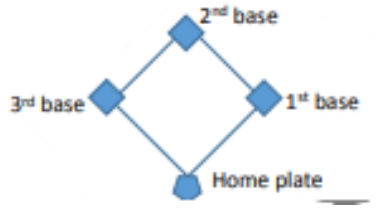


e

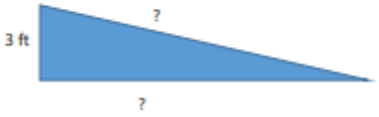


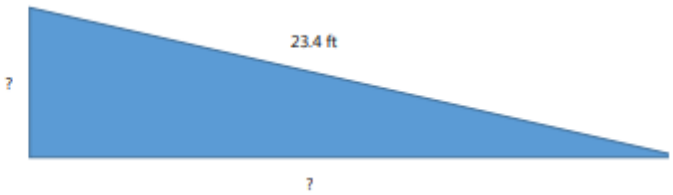
22. Right Triangle Word Problems. Show all work. Solve for the variables.

a) 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.



b) In order 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?





c) 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.