Algebra 2 CP 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 without a calculator (PEMDAS):

   a) $(17 - 6 \div 2) + (10^2 \cdot 3)$

   b) $8 - 5 \cdot 2^2 - 5(6 - 2)$

2. Evaluate:

   a) $-3^4 =$ _____

   b) $(-3^4) =$ _____

3. Simplify:

   a) $2y^2 + 3y - 5y^2 + y^5 + y$

   b) $3(b + 4) - (7 - b)$

   c) $2(x^2 + 3x) - x(x - 4)$

   d) $2x - (x^2 + 4) + 4x(x - 7)$

4. Solve for the variable:

   a) $-(y + 14) = 2(y - 10)$

   b) $6 = \frac{a}{4} + 2$

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

5. Evaluate the expression for the given value of the variable:

a) $x^2 - 4x - 7 \qquad when\ x = -4$

b) $x^3 + 3 \qquad when\ x = -2$

6. Evaluate each expression for $r = 6, s = 5, and\ t = 3$:

a) st

b) $rs \div t$

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

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

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

a) $w;$ $A = lw$

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

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

$x + 2y = 12$

$-2y \qquad -2y$

$\boxed{x = -2y + 12}$

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

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

10. 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.*

11. 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: $(x^2y^3)^4 = x^{2\bullet 4}\, y^{3\bullet 4} = x^8y^{12}$

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) $a \cdot a^2 \cdot a^3$ b) $(x^2y^3z)^7$ c) $\frac{m^9}{m^7}$

12. Solve the absolute value function for *x*:

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

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

$+5 \quad +5$

$|x + 8| = 7$

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

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

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

b) $|t - 4| = 9$ $t =$ _____ *or* t= _____

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

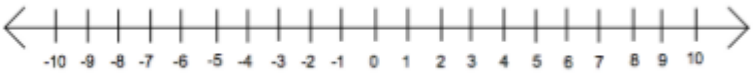
13. Solve and graph the solution set:

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".

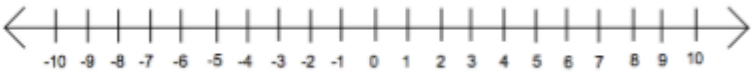
Example: $8r + 6 < 9r$
$-8r \quad -8r$
$6 < r$
$r > 6$

a) $3x + 2 > 11$

b) $x + 3 \leq 5$



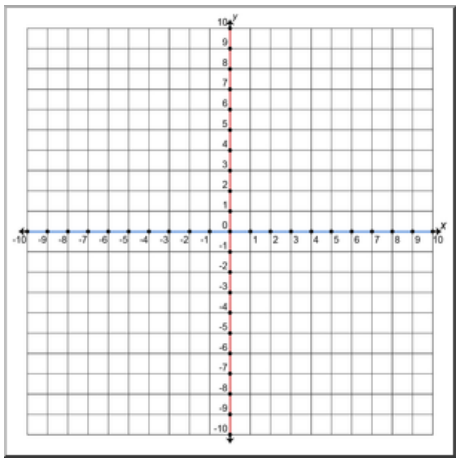
c) $2x - 10 < -12$



14. Graphing Linear Equations:

a) $2x + 3y = 6$

i. State the *x* and *y* intercepts: $x =$ _____ $y =$ _____



ii. Solve the equation for *y*: _____

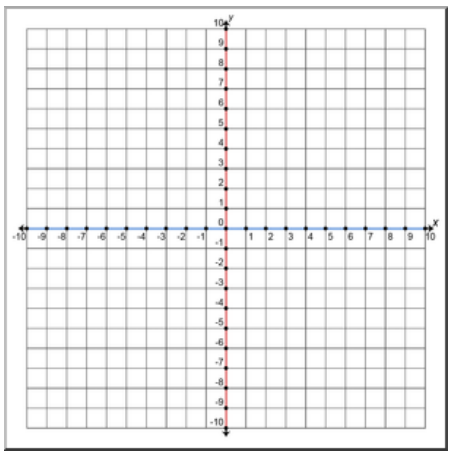
iii. Graph the equation on the coordinate plane:

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

Slope = _____ y-intercept = _____

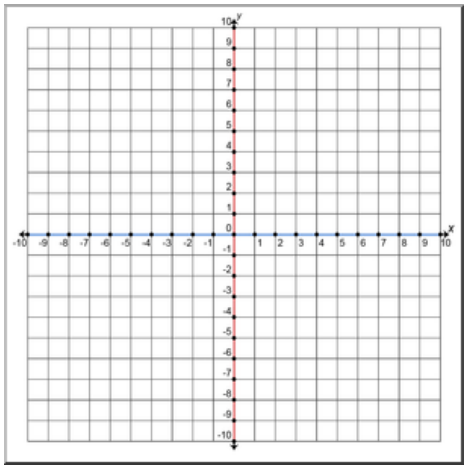
b) $x = 3$ (*Hint*: VUX)

i. Graph
ii. State the slope of the line: slope = _____

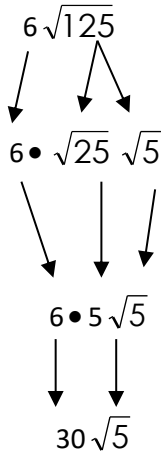


c) $y + 4 = 0$ (*Hint:* HOY)

i. Graph
ii. State the slope of the line: slope = _____



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



We keep bringing down each piece and multiply at the end.

a) $\sqrt{16}$ b) $\sqrt{75}$

c) $8\sqrt{5}$ d) $4\sqrt{108}$

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

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

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

b) $\sqrt{\frac{3}{4}}$ c) $\frac{\sqrt{3}}{6\sqrt{7}}$ d) $\frac{\sqrt{5}}{\sqrt{2}}$

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

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

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

b) $9y^2 - 16$ c) $30p^2 + 25p - 20$ d) $x^2 - 14x + 49$

18. Word Problems: Show all work. Solve for the variables.

a) <u>Write an algebraic model representing the problem. Then solve.</u>

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

A carnival charges $0.50 per ride in addition to a $4 per person admission fee. How many rides can you take if you have $13.50?

model _____

c) *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?