Algebra 2 CP 2025 Summer Packet Name _____

Please SHOW ALL THE WORK in the space provided. Be sure to circle your answers. This packet is to help you review topics that are considered to be prerequisite knowledge upon entering Algebra 2 CP. To ensure that the good skills you developed in the past two years do not disappear this summer, working on this packet is a requirement to be completed over the summer. It is **NOT** recommended to complete immediately following school dismissal in June or the night before the packet is due. Student learning is most effective if the packet is completed over the months of July and August.

Please bring in a hard copy of this packet on the first day of school.

Calculators: Although students enrolled in any algebra course should have a graphing calculator (a ***TI -84 or 84+***), these problems should be solved without using a calculator.

Complete the packet in PENCIL. Follow the directions in the packet and complete all the exercises, neatly SHOWING ALL your work in the packet. Be prepared for an assessment of this material in 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) $8 - 5 \cdot 2^2 - 5(6 - 2)$

   c) $14 \div [3(8 - 2) - 11]$

   d) $\frac{100-15}{9+8}$

   e) $32 \div (-7 + 5)^3$

2. Evaluate:

   a) $-3^4 =$ _____

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

3. Solve for the variable:

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

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

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

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

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

6. Evaluate each expression for

$r = 6,\ s = 5,\ \text{and}\ \ t = 3$:

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

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

$x + 2y = 12$

$-2y \quad -2y$

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

b) b; $y = mx + b$

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

Equations of a line:

- Slope-Intercept Form _____
- Point-Slope Form _____
- Standard Form _____

10. Write the equation of a line in **slope-intercept form** with the given slope and y −intercept: $m = -\frac{3}{4}$ $b = 5$

11. Write the equation of a line in **slope-intercept form** that passes through the points $(-1, -2)$ and $(2, 7)$. *Hint: Find the slope first.*

12. Write an equation of the line in **point-slope form** that passes through $(5, 4)$ and has a slope of -3.

10. 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) $\frac{m^9}{m^7}$

11. 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* $x + 8 = -7$

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

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

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

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

12. 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) $x + 3 \leq 5$

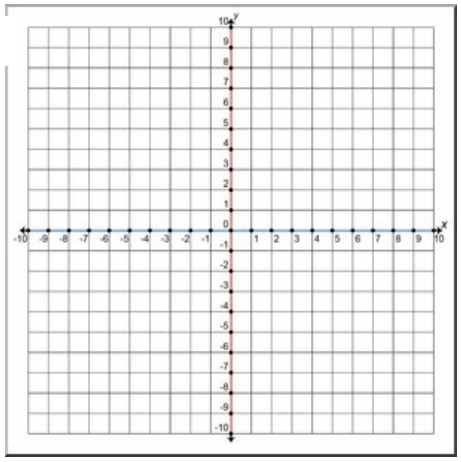
c) $2x - 10 < -12$

13. Graphing Linear Equations:

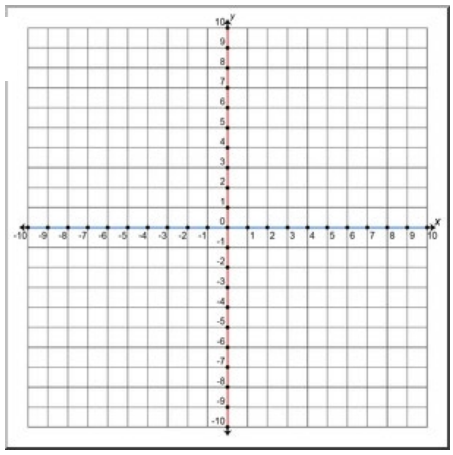
a) Graph $2x + 3y = 6$ using the x and y $intercepts$

$x =$ _____ $y =$ _____

a



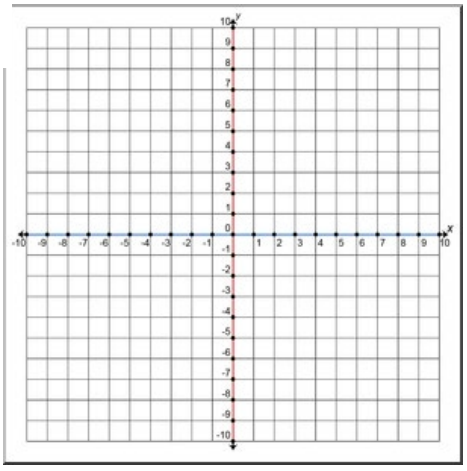
b & c



b) Graph $x - 3 = 0$ in red and state the slope: _____

c) Graph $y + 4 = 0$ in blue and state the slope: _____

d



d) Graph $3x + 2y = 2$ using slope-intercept form.

Slope = _____ y-intercept = _____

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

$6\sqrt{125}$

$6 \bullet \sqrt{25}\ \sqrt{5}$

$6 \bullet 5\sqrt{5}$

$30\sqrt{5}$

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

a) $\sqrt{16}$

b) $\sqrt{75}$

c) $8\sqrt{5}$

d) $4\sqrt{108}$

15. 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) $\frac{\sqrt{5}}{\sqrt{2}}$

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

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

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

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

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

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

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

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

b) $9y^2 - 16$

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

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

17. Solve each equation by factoring.

a) $x^2 + 2x - 8 = 0$ b) $x^2 - 4 = 0$ c) $2x^2 + 13x = -15$

24. Write an algebraic model representing the problem. Then solve.

a) 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) 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 _____