Algebra 2
Summer Packet

Welcome to Algebra 2! This packet is designed for all students entering all levels of Algebra 2 next year at TGS.

Directions: This packet reviews concepts you learned in previous math courses. Show all work for each problem, even if you use a calculator. If you need more space, you may attach additional notebook paper. The skills covered in this packet are important for success in Algebra 2 next school year. You will be assessed on these skills during the first week of school. The QR codes are there to assist you if you need a refresher on a concept.

Name:_____

Topic 1: Evaluate. Show All Work.

1. $2(3)^x \text{ if } x = 3$	2. $2\left(\frac{1}{3}\right)^x \text{ if } x = 2$
3. $12a - 4a^2 + 3a^3 \text{ if } a = -3$	4. $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ if } a = 1,\ b = -4,\ c = -21$

TOPIC 2:

A. **Solve each equation and check your solutions. SHOW ALL WORK!**

1. $4x + 9x = 39$
2. $8y - 2y + 4 = 22$
3. $3(x - 4) = 15$
4. $2y + 4(y + 5) = -16$
5. $3y = 2y + 14$
6. $4n + 3 = 2n - 5$
7. $-3y - 9 = 2y + 3$
8. $-3(2x - 3) = 20 - 4x$

9. $\frac{1}{3}(6x - 9) = 7 - 2x$

10. $5 + 2(x + 4) = 5(x - 3) + 10$

11. $6 + 2x(x - 3) = 2x^2$

B. Solve the one variable inequality.

12. $2x + 1 \geq -7$

13. $3(5x + 4) \leq 12x - 11$

14. $-8 > 5 - x$

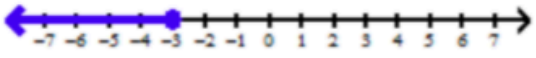
15. $3(x - 5) < 4 - (2 - 2x)$

16. $5x - 12 \geq 7x + 4$

17. $2x + 4 \leq 3(x - 2)$

Write the inequality or compound inequality for each graph.

18. _____



19. _____



C. Use inverse operations to solve for the specified variable

20. Solve for x: $x - b = a$

21. Solve for k: $-3k = m$

22. Solve for g: $aeg = 10$

23. Solve for y: $\frac{y}{3} = h$

24. Solve for y: $3x + y = 4$

25. Solve for x: $3y + 2x = -1$

26. Solve for b: $A = \frac{1}{2}bh$
(Area of a rectangle)

27. Solve for W: P=2L+2W
(Perimeter of a rectangle)

TOPIC 3: Write Equations

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-intercept form: $y = mx + b$ **[given m and b(y-intercept)]**

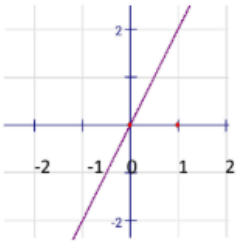
Point-slope form: $y - y_1 = m(x - x_1)$ **[given point** (x_1, y_1) **and m]**

A. Find the slope of the line passing through each pair of points.

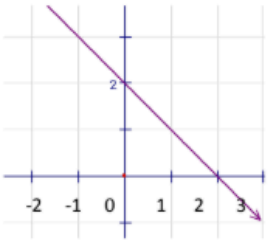
1. $(-3, -4)$ *and* $(-4, 6)$ 2. $(-4, -6)$ *and* $(-4, -8)$ 3. $(-5, 3)$ *and* $(-11, 3)$

Find the slope of each line from its graph.

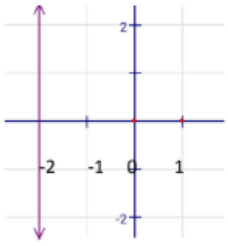
4. Slope = _____



5. Slope = _____



6. Slope = _____



Find the slope of the line from the following equations.

7. $y = 3x - 4$ 8. $2x + y = -4$ 9. $y - 3 = -4(x + 1)$

B. Write the equation of the line, in slope-intercept form, using the given information.

10. $(-2, 4)$ *and* $m = -3$

11. $(3, 4)$ *and* $m = -\frac{2}{3}$

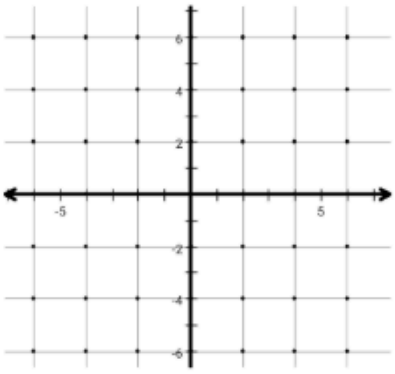
12. $(-2, 3)$ *and* $(0, 1)$

13. $(-6, -3)$ *and* $(-2, -5)$

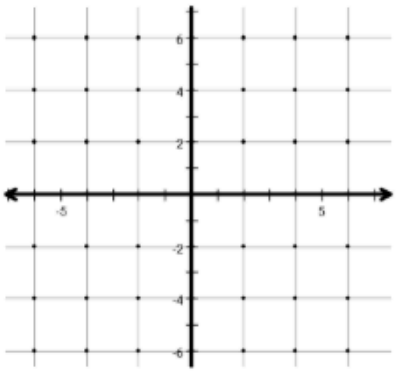
TOPIC 4: Graph Equations and Inequalities

A. Graph each linear equation.

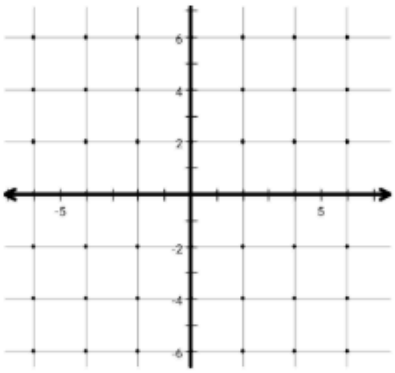
1. $y = -3x + 4$



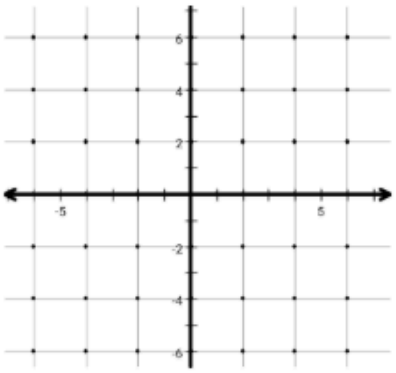
2. $y = 4 + x$



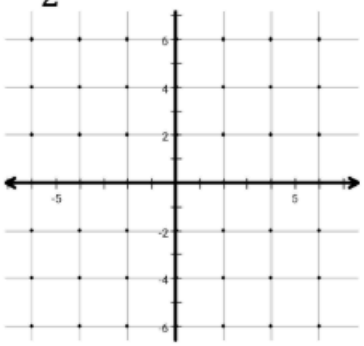
3. $x = -4$



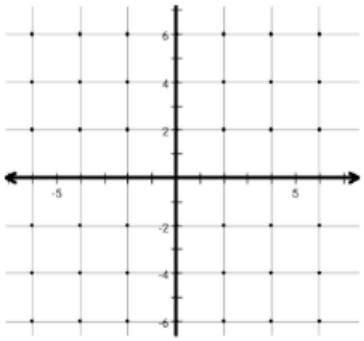
4. $y = 3$



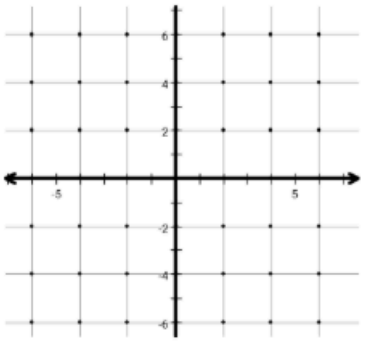
5. $y = -\frac{1}{2}x - 2$



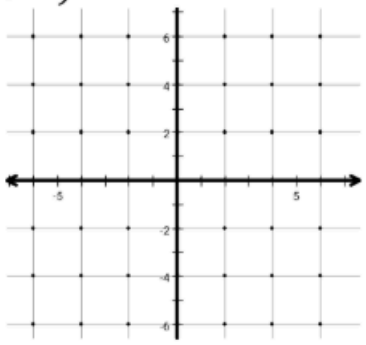
6. $2x + y = -4$



7. $2x - 5y = 10$

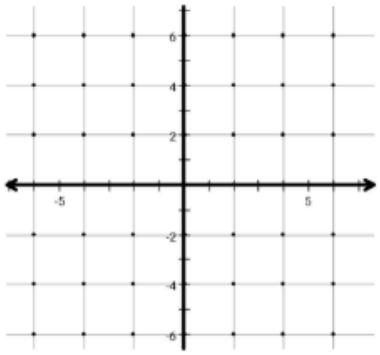


8. $y - 3 = -3(x + 1)$

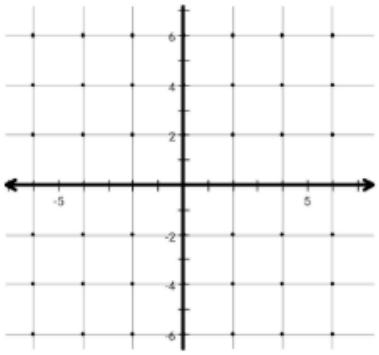


B. **Graph each linear *inequality.***

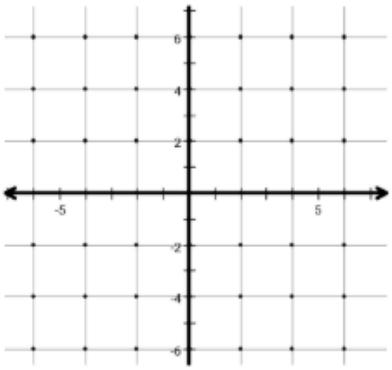
9. $x \geq -2$



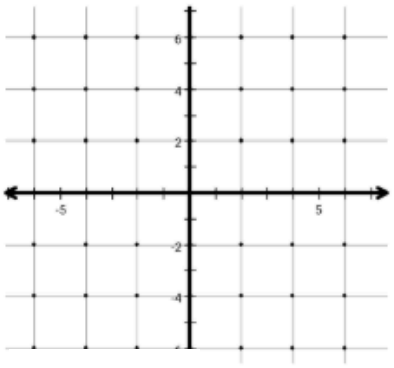
10. $y > 2x - 3$



11. $y < 3$



12. $3x - y \leq -3$



TOPIC 5: Solve Systems of Equations

A) Solve by graphing – graph the equations on the same graph. The solution will be the intersection of the 2 lines.

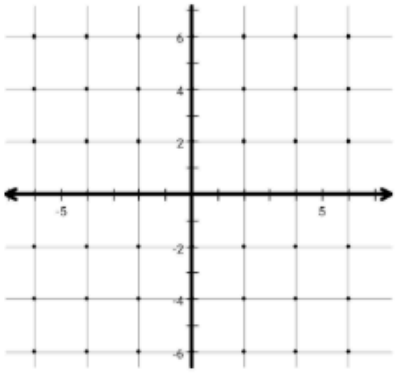
B) Solve by substitution – set one equation equal to a variable, then plug into the other equation for that variable.

C) Solve by elimination – Multiply through the equations to get opposite coefficients on one variable, then add equations.

A. Solve the system of linear equations.

1. $x + y = 6$ (use elimination)
   $x - y = 4$

2. $y = -3x - 1$ (use graphing)
   $y = 3x + 5$



3. $y = 2x + 4$ (use substitution)
   $-3x + y = 9$

4. $3x + 7y = -1$ (use elimination)
   $6x + 7y = 0$

5. $x - 5y = -14$
$3x + y = 6$
(Use any method)

6. $5x - 2y = 11$
$3x + 5y = 19$
(Use any method)

TOPIC 6: Functions

Function Notation:

- Identifies the independent variable in a problem.
  - $f(x) = x + 2b + c$, where the variable is "x".
- States which element of the function is to be examined.
- Find $f(2)$ when $f(x) = 3x$, is the same as saying, "Find y when $x = 2$, for $y = 3x$."

Evaluating a Function:

To evaluate a function, substitute the input (the given number or expression) for the function's variable (place holder, x). Replace the x with the number or expression.

Numeric Example: Given the function $f(x) = 2x - 5$, find $f(4)$

Solution: Substitute 4 into the function in place of x. $f(4) = 2(4) - 5 = 3$.
Therefore we can say the given function evaluated at x = 4 will yield a value of 3.
f(4) = 3

1. Let $g(x) = -5x + 2$. Evaluate each of the following:			
a. $g(-1)$	**b.** $g(-2)$	**c.** $g(0)$	**d.** $g(5)$
2. Let $f(x) = x^2 + 4x - 1$. Evaluate each of the following:			
a. $f(-4)$		**b.** $f(8)$	

TOPIC 7: Polynomial Operations

A. Addition and Subtraction

Combine Like Terms

$9x - 2y - 5y + 2 - 4x$	$5x^2 + 7x + 5 + 3x^2 - 2x + 4$
$-12x + 12x + 8$	$3xy + 5x - 2y + 4xy + 11x - 8$

B. Multiplication

Distributive Property

$5y - 4(x - y)$	$3(r + s) - 6(r + s)$
$2s + 7(2s - 2r)$	$5(a + b) + -2(a + b) - (a - b)$

C. **Multiplying Expressions by a Monomial**

A polynomial consisting of a single term is called a monomial. To multiply a polynomial with one term (monomial) by a polynomial consisting of more than one term, use the distributive property. You multiply the term outside the parentheses by every term inside the parentheses.

Example: $2(a+b-3) = 2a+2b-6$

$3x(x^2+2x) = 3x^3+6x^2$

$5(x-y+2)$	$7x(x-3)$
$3b(x^2+2xy+y)$	$8x^3(3x^2+2x-5)$

Honors Algebra 2 students ONLY!

TOPIC 8: Radical Expressions

A. **Simplify the radicals.**

1. $\sqrt{50}$
2. $\sqrt{24}$
3. $\sqrt{192}$
4. $\sqrt{289}$
5. $\sqrt{\frac{13}{49}}$
6. $\sqrt{\frac{6}{27}}$

B. Simplify.

7. $\sqrt{12}\cdot\sqrt{3}$

8. $\sqrt{6}\cdot\sqrt{8}$

9. $\sqrt{7}\cdot\sqrt{5}$

10. $\frac{3\sqrt{2}}{\sqrt{3}}$

11. $\frac{4\sqrt{2}}{\sqrt{12}}$

12. $\frac{5}{\sqrt{8}}$

ALL STUDENTS: Exponents – Simplify each expression. There should be **no** radicals or negative exponents.

1.	$(2x^4)(4x)$	2.	$(x^2)^0$
3.	$\frac{2y^7}{y^5}$	4.	$(x^2y^3)^2$
5.	$\left(\frac{2x}{y}\right)^2$	6.	$\frac{x^{-4}}{x^3}$

7.	$(4xy)^{-1}$	8.	$(2x^3y^{-3})(2x^{-1}y^3)$
9.	$\frac{4m^4n^3p^3}{3m^2n^2p^4}$	10.	$(x^4)^{-3}(2x^4)$
11.	$\frac{(x^3y^3)(x^3)}{4x^2}$	12.	$\left(x^{\frac{2}{3}}\right)\sqrt[3]{x}$