

# Algebra 2

# Summer Prep

# Packet

Welcome to Algebra 2! This packet is for all students entering 10th Grade Standard Algebra 2, 10th Grade Honors Algebra 2, 11th Grade Honors Algebra 2, and 11th Grade Accelerated Algebra 2.

Attached, you will find the basic learning targets from Algebra 1 that you are expected to remember **BEFORE** you come to class in the fall. For each Algebra topic addressed, this packet contains review examples, properties, definitions, and online video tutorial links followed by practice problems. This material must be mastered in order for you to be successful in Algebra 2. You will be assessed at the beginning of the school year. Since this material is designed as a review, you are responsible for completing this packet on your own. The packet will be graded to assess the student's **EFFORTS** to recall this information. Be sure to **SHOW ALL WORK!**

**Name:**

# Target Checklist

## **Target 1: Evaluate and Rewrite Expressions**

- A. Evaluate numerical/algebraic using order of operations
- B. Rewrite by distributing

## **Target 2: Solve Equations and Inequalities**

- A. Solve One Variable Equations
- B. Solve One Variable Inequalities
- C. Solve Literal Equations

## **Target 3: Write Equations**

- A. Find Slope
- B. Write Equations of Lines

## **Target 4: Graph Equations and Inequalities**

- A. Graph Linear Equations
- B. Graph Linear Inequalities

## **Target 5: Solve Systems of Equations**

- A. Solve Systems of linear equations

## **Target 6: Exponential Expressions**

- A. Simplify Exponential Expressions

## **Target 7: Factor Quadratics**

- A. Factor Specials (GCF, Difference of Squares)
- B. Factor Trinomials
- C. Solve Simple Quadratics

## **Target 8: Radical expressions**

- A. Simplify Radical Expressions
- B. Combine Radical Expressions

## **Target 9: Conversions**

- A. Convert from one Unit to another
- B. Scientific Notation

## Target 1:

### A. Order of Operations (PEMDAS)

- Parentheses or other grouping symbols
- Exponential expressions
- Multiplication AND Division (whichever one comes first)
- Addition AND Subtraction



Simplify each numerical expression.

1.  $8 + 2 - 7$

2.  $9 \div 3 + 7$

3.  $5 + 4 - 9 \div 3$

4.  $7 \cdot (3 + 4)$

5.  $(4 + 8) \div (3 - 1)$

6.  $6 + 2 \cdot 8 - 12 + 9 \div 3$

7.  $10x + 2 - 8x - 10$

8.  $\frac{15 - [8 - (2 + 5)]}{18 - 5^2}$

9.  $100 - [20(3) \div 6 + 15 \div 5]$

**B. Simplify.**

10.  $-2(x - 4)$

11.  $5 + 2(x + 6)$

12.  $2(3x + 4) - 5(x - 7)$



13.  $(x + 3)(x - 2)$

14.  $(2x + 3)^2$

15.  $2(x + 3)^2$



**Evaluate.**

33.  $1.2(3)^x$  if  $x = 3$

34.  $2\left(\frac{1}{3}\right)^x$  if  $x = 2$



29.  $12a - 4a^2 + 7a^3$  if  $a = -3$

30.  $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$  if  $a = 1, b = -4, c = -21$

32.  $\frac{3(x+y) - 2(x-y)}{5x+y}$  if  $x = 3, y = 4$

## TARGET 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.  $3(x - 5) < 4 - (2 - 2x)$

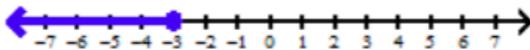
16.  $5x - 12 \geq 7x + 4$

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:  $ae g = 10$

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)

## Target 3:

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

**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.**

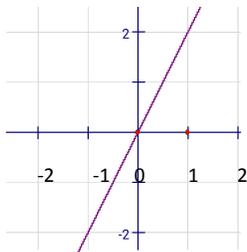
1.  $(-3, -4)$  and  $(-4, 6)$

2.  $(-4, -6)$  and  $(-4, -8)$

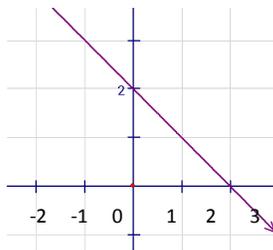
3.  $(-5, 3)$  and  $(-11, 3)$

**Find the slope of each line from its graph.**

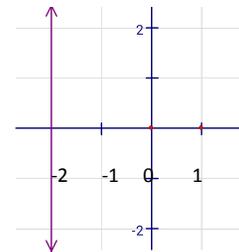
4. Slope = \_\_\_\_\_



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  $(0, 1)$

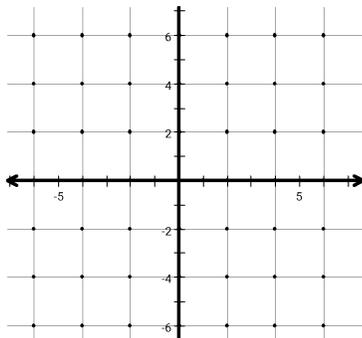
13.  $(-6, -3)$  and  $(-2, -5)$

**Target 4:**

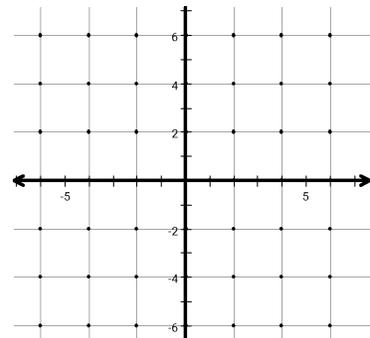
A. Graph each linear equation.



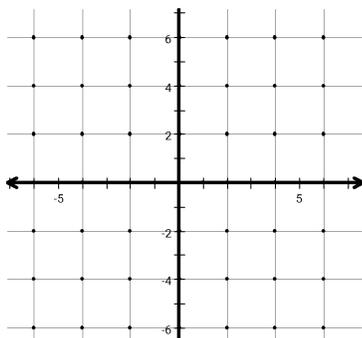
1.  $y = -3x + 4$



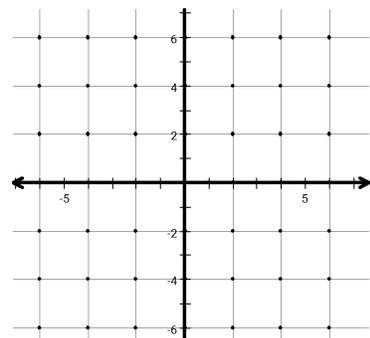
2.  $y = 4 + x$



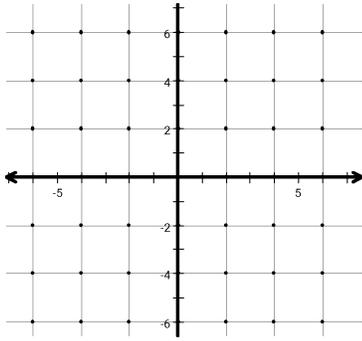
3.  $x = -4$



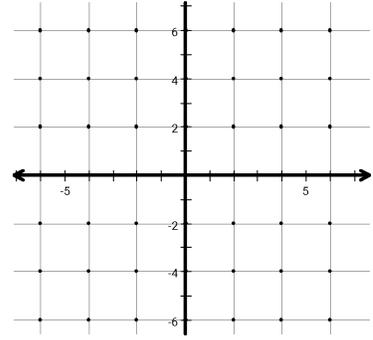
4.  $y = 3$



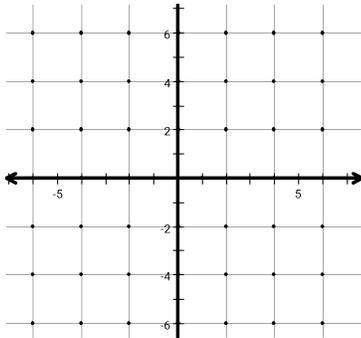
5.  $y = -\frac{1}{2}x - 2$



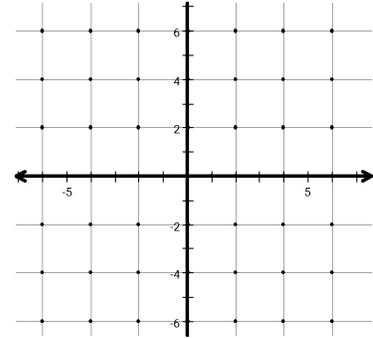
6.  $2x + y = -4$



7.  $2x - 5y = 10$



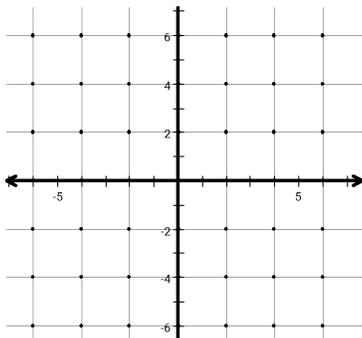
8.  $y - 3 = -3(x + 1)$



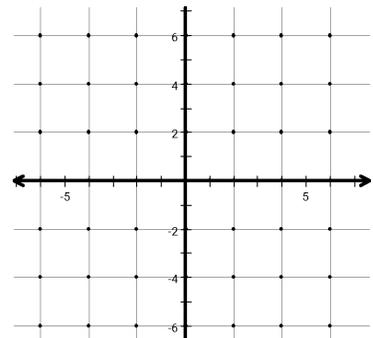
**B. Graph each linear *inequality*.**



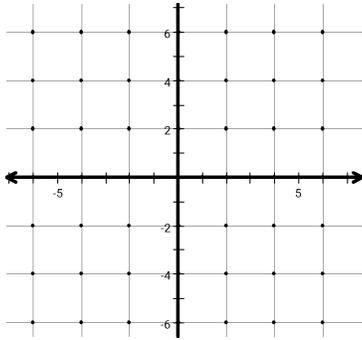
9.  $x \geq -2$



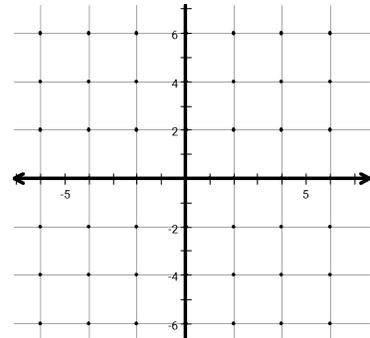
10.  $y > 2x - 3$



11.  $y < 3$



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



### Target 5:

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.

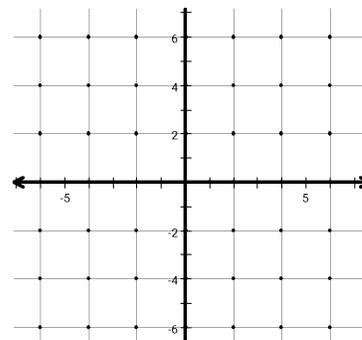
C) Solve by elimination – Multiply through the equations to get opposite coefficients on one variable, then add equations.



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

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

**Target 6:**

Properties of Exponents:



PROPERTY		EXAMPLE
Product of Powers	$a^m \cdot a^n = a^{m+n}$	$x^4 \cdot x^2 =$
Power of a Power	$(a^m)^n = a^{m \cdot n}$	$(x^4)^2 =$
Power of a Product	$(ab)^m = a^m \cdot b^m$	$(2x)^3 =$
Negative Power	$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$	$x^{-3} =$
Zero Power	$a^0 = 1 \quad (a \neq 0)$	$4^0 =$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0)$	$\frac{x^3}{x^2} =$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (a \neq 0)$	$\left(\frac{x}{y}\right)^3 =$

**A. Simplify.**

1.  $g^5 \cdot g^{11}$

2.  $(b^6)^3$

3.  $w^{-7}$

4.  $\frac{y^{12}}{y^8}$

5.  $(3x^7)(-5x^3)$

6.  $(-4a^5b^0c)^2$

7.  $(-x^2)(-x^5)$

8.  $y^3(y^4)(-y^5)$

9.  $(3x)(7x^2)$

10.  $(-4y^3)(-7y^2)$

11.  $y(5y^2)(-2y^3)$

12.  $(n^9)^8$

13.  $(-x)^3$

14.  $\frac{x^3}{x^3}$

\*\*\*11th Grade Honors/10th Grade Standard move to Target 7\*\*\*

\*\*11th Grade Accelerated/10th Grade Honors complete #s 15-18\*\*

15.  $\frac{x^2y^5}{xy^2}$

16.  $\frac{25x^3y^2}{5xy}$

17.  $\frac{18m^8n^5}{-3m^6n^3}$

18.  $\frac{-20x^9y^4z^3}{-5x^7y^2z}$

## Target 7:

A. Factor completely.



1.  $16y^2 + 8y$

2.  $18x^2 - 12x$

3.  $15x^2 + 24$

4.  $x^2 - 25$

6.  $2x^2 - 18$

7.  $x^2 + 4x + 4$

8.  $m^2 + 12m + 32$



9.  $x^2 - 12x + 36$

10.  $y^2 + 4y - 21$

11.  $x^2 - 5x + 6$

12.  $x^2 - 3x - 4$

13.  $x^2 - 6x - 7$

\*\*\*11th Grade Honors/10th Grade Standard move to Target 8\*\*\*

\*\*11th Grade Accelerated/10th Grade Honors complete #s 14-17\*\*

$$14. 3x^2 + 3x - 6$$

$$15. 18 + 8x - 48$$

$$16. 4x^2 + 28x + 48$$

$$17. 6x^2 - 24x + 18$$

**Target 8:**  
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.  $\frac{5}{\sqrt{8}}$

## Target 9:

- There are 5280 feet in 1 mile and 12 inches in a foot
- There are 1.6 kilometers in 1 mile
- There are 1.05 quarts in 1 liter
- There are 4 quarts in 1 gallon



## A. Convert labels.

1. Convert 23 miles to feet.

2. Convert 120 pounds to kilograms.

3. Convert 6 feet to miles.

4. Convert 4 quarts to liters.

5. Convert 75 minutes to days.

6. Convert 46 inches to miles.

8. How many miles would you run in a 5 kilometer race?

9. If your house is 7.2 miles away from the school, how many feet is that?

10. How many seconds are there in a day?

**B. Convert**

**Convert from Standard form to Scientific Notation.**

1. 9,900,000

2. 9.3

3. 48.59

4. 0.006

5. 0.00007693

6. 106.2

7. 0.00573

8. 0.223



**Convert from Scientific Notation to Standard Form.**

1.  $6.5 \times 10^5$

2.  $3.75 \times 10^0$

3.  $7.21 \times 10^{-3}$

4.  $8 \times 10^4$

5.  $9.57 \times 10^7$

6.  $1.23 \times 10^{-1}$

7.  $4.515 \times 10^9$

8.  $4.879 \times 10^{-6}$