

# Algebra 2 Summer Prep Packet

Welcome to Algebra 2! This packet is for all students entering Honors Algebra 2 or Regular 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 your work!**

Name: \_\_\_\_\_

# Target Checklist

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

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

## **Target 2: Solve equations/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**

- A. Solve systems of linear equations

## **Target 6: Exponential Expressions**

- A. Simplify exponential expressions

## **Target 7: Factor quadratics**

- A. Factor Specials (GCF, Diff Sq, perfect sq tri)
- B. Factor trinomials
- C. Solve simple quadratics

## **Target 8: Radical expressions**

- A. Simplify radical expressions
- B. Combine radical expressions

## **Target 9:**

- A. Convert from one label 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 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.

16.  $1.2(3)^x$  if  $x = 3$

17.  $2\left(\frac{1}{3}\right)^x$  if  $x = 2$

18.  $12a - 4a^2 + 7a^3$  if  $a = -3$

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

20.  $\frac{3(x+y) - 2(x-y)}{5x+y}$  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.  $3(x - 5) < 4 - (2 - 2x)$

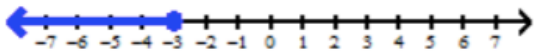
16.  $5x - 12 \geq 7x + 4$

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

Write the inequality for each graph.

18.

\_\_\_\_\_



19.

\_\_\_\_\_



C. Solve each of the following 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 triangle)

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

### Target 3:

Recall:

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

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  $(-4, 6)$

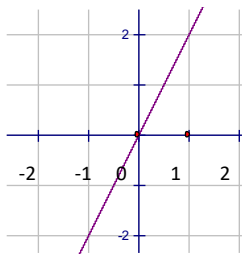
2.  $(-4, -6)$  and  $(-4, -8)$

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

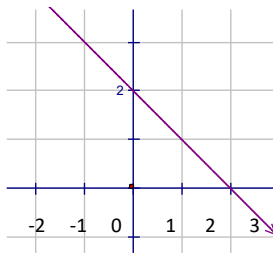
Find the slope of each line from its graph.



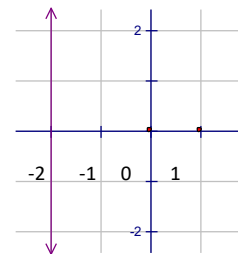
4. Slope = \_\_\_\_\_



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  $(0, 1)$

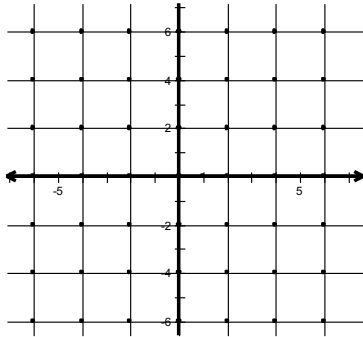
13.  $(-6, -3)$  and  $(-2, -5)$

## Target 4:

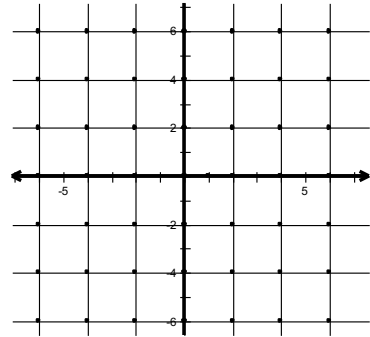
A. Graph each linear equation.



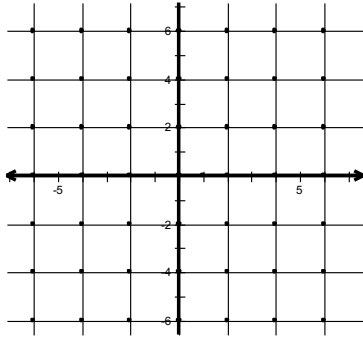
1.  $y = -3x + 4$



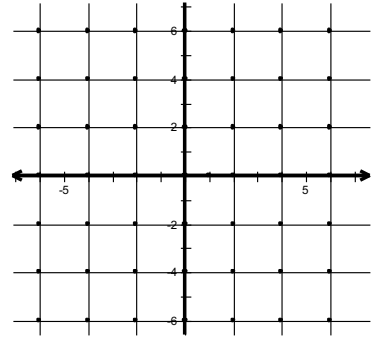
2.  $y = 4 + x$



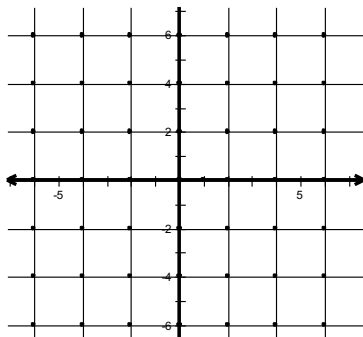
3.  $x = -4$



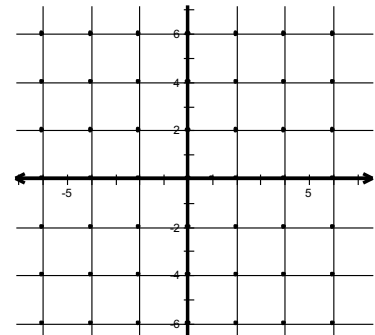
4.  $y = 3$



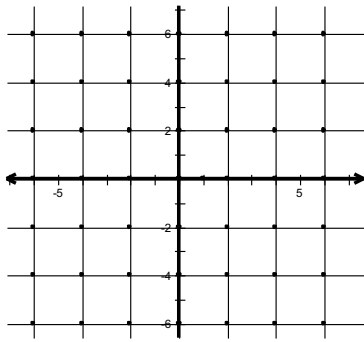
5.  $y = -\frac{1}{2}x - 2$



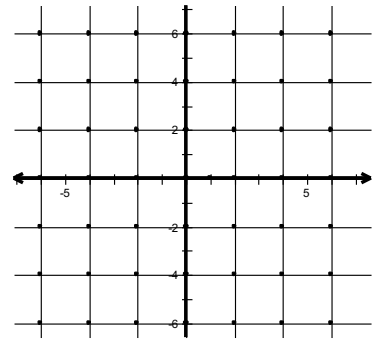
6.  $2x + y = -4$



7.  $2x - 5y = 10$



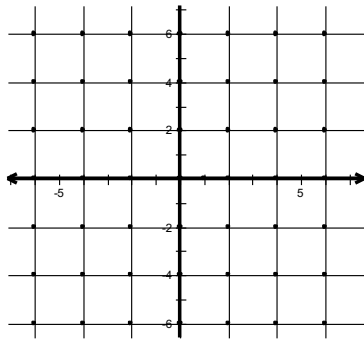
8.  $y - 3 = -3(x + 1)$



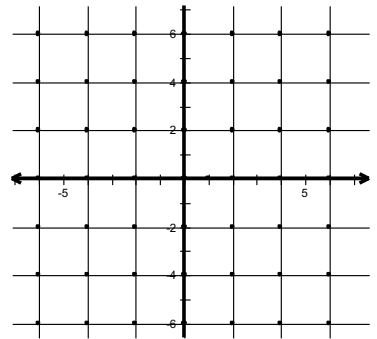
B. Graph each linear *inequality*.



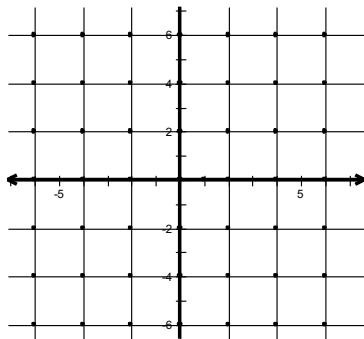
9.  $x \geq -2$



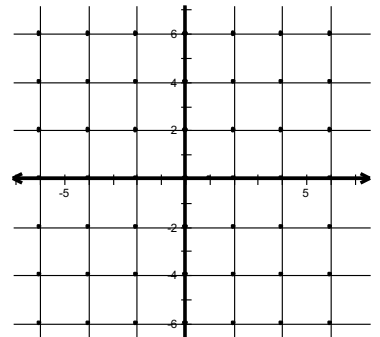
10.  $y > 2x - 3$



11.  $y < 3$



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



## Target 5:

### Recall:

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 linear combination – 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.  $y = -3x + 7$  (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.  $\frac{x^3}{x^3}$

\*\*\*Regular go to Target 7, Honors finish problems 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/B. 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.  $x^2 - 6x - 7$



\*\*\*Regular move to Target 8, Honors finish #14 - 17\*\*\*

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

15.  $8x^2 + 8x - 48$

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

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

## Target 8:

A. Simplify the radical.



1.  $\sqrt{50}$

2.  $\sqrt{24}$

3.  $\sqrt{192}$

4.  $\sqrt{289}$

5.  $\sqrt{\frac{13}{49}}$

6.  $\sqrt{\frac{6}{27}}$

B. Combine.

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
- There are 1.6 kilometers in 1 mile
- There are 1.05 quarts in 1 liter
- There are 4 quarts in 1 gallon
- There are 2.2 pounds in 1 kilogram



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

