

Coventry High School  
Math Department

Algebra II Summer Packet  
2024 - 2025

The problems in this packet are designed to help you review topics from Algebra I that are important to your success in Algebra II. The topics covered in this packet should be addressed and reviewed before entering Algebra II. Examples have been provided in each section to help you get started and refresh your memory of these concepts.

Our first few units are on Probability, Statistics, and Functions.

It is advised that you do all of the work for each problem right on this packet.

**You will be turning in Part F to be graded to your Algebra II teacher.**

**Your answers to the other topics will be submitted online.**

Please go to

<https://forms.gle/JH81qxCxvs8n2qt7A>

**(numbers and upper/lowercase matter)** to submit these answers.

**\*\*\*Please note that you cannot submit your answers on the google form until the form opens on August 1, 2024.\*\*\***

This packet is due on the first day of school and will count as one of your first grades of the school year!

While it is not required, it is strongly recommended that students buy a calculator for their personal use throughout the school year. Although a scientific calculator is sufficient in this course, the purchase of a TI – 83 graphing calculator will be the calculator to use during your high school experience.

## Part A - Solving Equations

To solve equations, first simplify both sides of the equation. If the equation contains fractions, multiply the equation by the LCD to clear the equation of fractions. Use the addition and subtraction properties of equality to get variables on one side and constants on the other side of the equal sign. Use the multiplication and division properties of equality to solve for the variable. Express all answers as fractions in lowest terms.

*Tutorials:*

Solving Linear Equations: <http://www.purplemath.com/modules/solvein.htm>

Solving Equations:

<https://www.khanacademy.org/math/in-eighth-grade-math/linear-equations-one-variable/solving-equations-variable-both-sides/v/multi-step-equations-1>

Examples:

$$a) 3(x + 5) + 4(x + 2) = 21$$

$$3x + 15 + 4x + 8 = 21$$

$$7x + 23 = 21$$

$$7x = -2$$

$$x = -\frac{2}{7}$$

$$b) 2(5x - 4) - 10x = 6x + 3(2x - 5)$$

$$10x - 8 - 10x = 6x + 6x - 15$$

$$-8 = 12x - 15$$

$$7 = 12x$$

$$\frac{7}{12} = x$$

$$c) \frac{2}{3}x + 5 = 6x - \frac{3}{4}$$

$$12\left(\frac{2}{3}x + 5 = 6x - \frac{3}{4}\right)$$

$$8x + 60 = 72x - 9$$

$$69 = 64x$$

$$\frac{69}{64} = x$$

Solve for the indicated variable: (Any fractions should be written as a decimal)

$$1) 3n + 1 = 15n - 5$$

$$2) 2[x + 3(x - 1)] = 18$$

$$3) 6(y - 2) + 4 = 10$$

$$4) 2x^2 = 50$$

$$5) 5 + 2(k + 4) = 5(k - 3) + 10$$

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

$$7) \frac{2}{3}x - 18 = \frac{x}{6}$$

$$8) \frac{x - 2}{3} = \frac{2x + 1}{4}$$

## Part B - Operations with Polynomials

Remember: When you perform operations on polynomials, you are really just combining like terms!

Examples:

### Adding Polynomials

$$a) (3x^2 - 4x + 2) + (5x^2 + 2x + 7)$$

$$8x^2 - 2x + 9$$

### Subtracting Polynomials

$$b) (3x^2 - 4x + 2) - (5x^2 + 2x + 7)$$

*Don't forget to distribute the negative!*

$$-2x^2 - 6x - 5$$

### Multiplying Polynomials

$$c) (2x + 1)(3x - 2)$$

$$6x^2 - 4x + 3x - 2$$

$$6x^2 - x - 2$$

Simplify the following expressions:

$$1) (4x^2 + x - 1) + (5x^2 - x + 7)$$

$$2) (3x^2 - 4x) - (5x^2 + x - 7)$$

$$3) 3x(5x + 2)$$

$$4) (5x + 2)(x - 3)$$

## Part C - Function Notation

**Examples:** Given  $f(x) = -3x + 5$ ;  $g(x) = \frac{1}{2}x$ ;  $h(x) = x^2 + 3$

a) Find  $f(4)$

$$\begin{aligned} f(4) &= -3(4) + 5 \\ &= 7 \end{aligned}$$

b) Find  $g(-2)$

$$\begin{aligned} g(-2) &= \frac{1}{2}(-2) \\ &= -1 \end{aligned}$$

c) Find  $h(-3)$

$$\begin{aligned} h(-3) &= (-3)^2 + 3 \\ &= 9 + 3 \\ &= 12 \end{aligned}$$

d) Find  $x$  if  $f(x) = -10$

$$\begin{aligned} 10 &= -3x + 5 \\ -15 &= -3x \\ 5 &= x \end{aligned}$$

e) Find  $x$  if  $g(x) = 20$

$$\begin{aligned} 2 \cdot 20 &= \frac{1}{2}x \cdot 2 \\ 40 &= x \end{aligned}$$

Given the functions below, evaluate each of the following

$$f(x) = -x - 2; \quad g(x) = \frac{2}{3}x + 3; \quad h(x) = x^2 + 1$$

1. Find  $g(3)$

2. Find  $h(-1)$

3. Find  $g(-9)$

4. Find  $h(0)$

5. Find  $x$  if  $g(x) = 7$

6. Find  $x$  if  $f(x) = 1$

7. Find  $x$  if  $g(x) = 11$

## Part D - Solving Systems of Equations

<p>Solve for x and y: <math>x = 2y + 5</math>   <math>3x + 7y = 2</math></p> <p>Using <u>substitution</u> method:</p> <p><math>3(2y + 5) + 7y = 2</math> <math>6y + 15 + 7y = 2</math> <math>13y = -13</math> <math>y = -1</math></p> <p><math>x = 2(-1) + 5</math> <math>x = 3</math></p> <p>Solution: (3, -1)</p>	<p>Solve for x and y: <math>3x + 5y = 1</math>   <math>2x + 3y = 0</math></p> <p>Using <u>linear combination</u> (addition/ subtraction) method:</p> <p><math>3(3x + 5y = 1)</math> <math>-5(2x + 3y = 0)</math></p> <p><math>9x + 15y = 3</math> <u><math>-10x - 15y = 0</math></u> <math>-1x = 3</math> <math>x = -3</math></p> <p><math>2(-3) + 3y = 0</math> <math>y = 2</math></p> <p>Solution: (-3, 2)</p>
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*Tutorials:*

Solve systems of equations (video): <https://www.youtube.com/watch?v=vA-55wZtLeE>  
<http://www.purplemath.com/modules/systlin1.htm>

Solve each system of equations by either the substitution method or the linear combination (addition/ subtraction) method. **Write your answer as an ordered pair. If there are no solutions write "none", and if there are an infinite number of solutions write "infinite".**

1)  $y = 2x + 4$   
 $-3x + y = -9$

2)  $2x + 3y = 6$   
 $-3x + 2y = 17$

3)  $x - 2y = 5$   
 $3x - 5y = 8$

4)  $12x + 14y = 0$   
 $6x + 7y = 0$

## Part E - Relations and Functions

### Relations:

5	5	6	7	8	9	10
40	42	44	47	50	52	54

A relation is any set of ordered pairs. The set of all x-values from the ordered pairs is called the domain, and the set of all of the y-values is called the range.

#### Examples of relations:

a.  $\{(1,5), (1,6), (2,3), (5,7)\}$

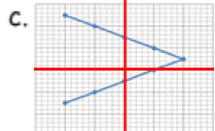
Domain:  $\{1, 2, 5\}$  Notice, we don't write the 1 twice

Range:  $\{3, 5, 6, 7\}$  Notice, we write in increasing order

b.

Domain:  $\{5, 6, 7, 8, 9\}$

Range:  $\{40, 42, 44, 47, 50, 52, 54\}$



Domain:  $-10 \leq x \leq 10$

Range:  $-7 \leq y \leq 13$

d.  $y = 2x + 5$

Domain: All real numbers or  $-\infty \leq x \leq \infty$

Range: All real numbers or  $-\infty \leq y \leq \infty$

### Functions:

5	5	6	7	8	9	10
40	40	44	47	50	52	54

A function is a relation in which each member of the domain corresponds to exactly one member of the range. Each x-value can only go to one y-value. An x-value can repeat, but it must go to the same y-value!

#### Examples of functions:

a.  $\{(1,5), (4,6), (2,3), (5,7)\}$

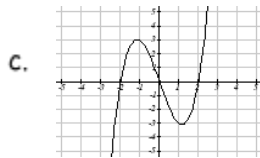
Domain:  $\{1, 4, 5\}$  Notice, we don't write the 1 twice

Range:  $\{3, 5, 6, 7\}$  Notice, we write in increasing order

b.  $y = 2x + 5$

Domain: All real numbers or  $-\infty \leq x \leq \infty$

Range: All real numbers or  $-\infty \leq y \leq \infty$



Domain: All real numbers or  $-\infty \leq x \leq \infty$

Range: All real numbers or  $-\infty \leq y \leq \infty$

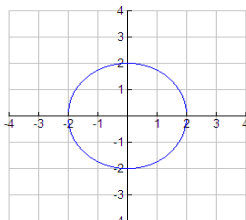
Determine if the following relations are functions

1.

x	1	2	3	4
y	10	12	14	16

2.  $\{(2, 6) (0, 8) (-2, 6) (0, 9)\}$

3.



4.  $y = -x^2 + 5$

Hello My Name Is: \_\_\_\_\_

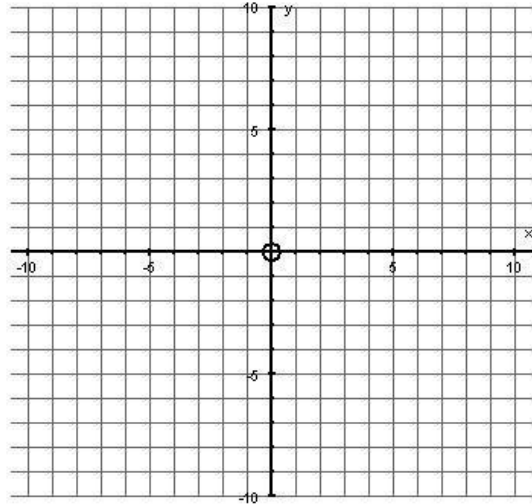
Period: \_\_\_\_\_

### Part F - Graphing

Complete the table of values to graph the following functions:

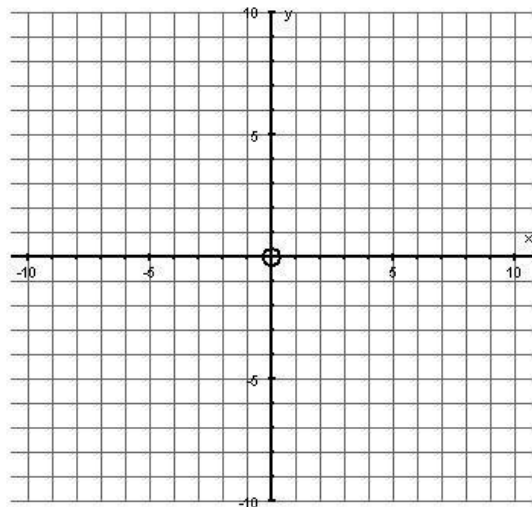
1)  $y = x + 3$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



2)  $y = x^2 + 2x + 3$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



3)  $y = 3 \cdot 2^x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	

