

All students going into Algebra II Honors in the fall must complete this packet for the first day of school. Students should be comfortable with these skills prior to the beginning of class in order to progress through the Algebra II Honors curriculum comfortably.

Students will review the concepts contained in this packet during the first few days of class. Following this review, students will be assessed on the material covered in this packet. The assessment will be graded for accuracy and will be part of the first marking period grade.

### **Section I: Vocabulary**

**Fill in each blank with the correct term. Pick a word or expression from the list provided.**

irrational	coefficient	factor
function	quadratic	rational
domain	x-intercept	y-intercept
range		

1. A number that multiplies a variable or variables in an expression is called a \_\_\_\_\_.
2. Each expression that is multiplied together to form a product is called a \_\_\_\_\_.
3. A \_\_\_\_\_ expression is a polynomial with the highest exponent of 2.
4. The set of \_\_\_\_\_ numbers contains any number that can be written as a ratio of two integers.
5. The set of \_\_\_\_\_ numbers contains any number that cannot be written as a fraction using integers and can not be represented as a terminating or repeating decimal equivalent.
6. A special relation where each input has exactly one output is called a(n) \_\_\_\_\_ .
7. The \_\_\_\_\_ represents the point on the vertical axis and also describes the initial amount of a function.
8. Any coordinate pair that has a y-coordinate of zero represents a(n) \_\_\_\_\_ of the graph.
9. The \_\_\_\_\_ of a function is the set of possible x-values or inputs for the function.
10. The \_\_\_\_\_ of a function is the set of possible y-values or outputs for the function.

## **Section II: Solving Multi-Step Equations**

*Steps for solving multi-step equations*

1. Simplify each side of the equation first. To do this, you may want to eliminate fractions or decimals, combine like terms, or use the distributive property to eliminate parenthesis.
2. Get all variables on one side and all numbers on the other side.
3. Isolate the variable using an inverse operation.

### **Solving for a Variable**

Solving for a single variable is just like solving an equation, by isolating the variable you are solving for using inverse operations. Remember your answer will have other variables in it.

**Use these videos as a resource if you need to review these topics:**

*Solving a Multi-step Equation Example Problem:* <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equations-distribution/v/equation-special-cases>

*Eliminating Fractions:* <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equations-distribution/v/solving-equations-with-the-distributive-property-2>

*Solving for a Variable Example Problem:* [https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/solving\\_for\\_variable/v/solving-for-a-variable](https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/solving_for_variable/v/solving-for-a-variable)

**Directions: Solve the following equations. Check your solutions.**

11.  $9 - \frac{4}{5}(u - 3) = 1$

12.  $-\frac{3}{2}(d - 2) = 21$

13.  $4(a + 2) = 14 - 2(3 - 2a)$

14.  $2(g - 2) - 4 = 2(g - 3)$

15.  $2x + \frac{2}{3}(4 - x) = \frac{1}{6}(4x + 5) + \frac{9}{2}$

16.  $\frac{5}{2}t - t = 3 + \frac{3}{2}t$

17. Solve for  $y$ :  $3x - 4y = 24$

18. Solve for  $t$ :  $A = P + Prt$

19. Solve for  $r$ :  $A = P + Prt$

20. Solve for  $P$ :  $A = P + Prt$

### Section III: Functions

#### Function Vocabulary

**Relation** – A relation is a pairing of inputs and outputs and is often represented as a set of points  $(x, y)$ .

**Domain** – the set of x-values in a given relation, also known as the inputs.

**Range** – the set of y-values in a given relation, also known as the outputs.

**Function** – a special relation where each input has exactly one output.

**Vertical Line Test** – states that if you can draw a vertical line through more than one point on a given graph, then the relation is not a function.

**Examples:** (a) Given the relation  $\{(6, 5), (4, 3), (6, 4), (5, 8)\}$

Domain:  $\{4, 5, 6\}$                       Range:  $\{3, 4, 5, 8\}$

This relation is not a function because the input 6 has two outputs, 4 and 5

(b) Given the relation  $\{(1, 1), (2, -3), (3, 0), (4, 1)\}$

Domain:  $\{1, 2, 3, 4\}$                       Range:  $\{-3, 0, 1\}$

This relation is a function because every input has exactly one output.

Use these videos as a resource if you need to review these topics:

Functions <https://www.khanacademy.org/math/algebra/algebra-functions>

**Directions: Determine the Domain and Range of each relation. Then state whether the relation is a function.**

21.  $\{(-4, 6), (3, 6), (7, -9), (8, 1)\}$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Function? \_\_\_\_\_

22.  $\{(-4, 6), (3, 8), (6, 4), (3, -9), (5, 7)\}$

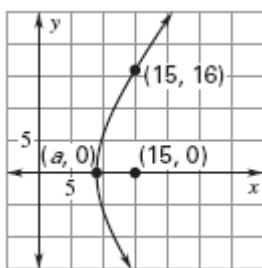
Domain: \_\_\_\_\_

Range: \_\_\_\_\_

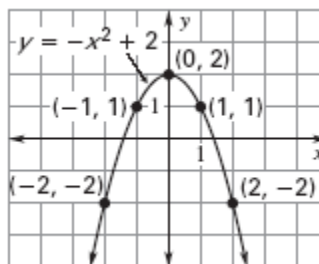
Function? \_\_\_\_\_

**Directions: Use the vertical line test to determine if each relation is a function.**

23.



24.



**Directions: Evaluate the function at the given value.**

25. If  $f(x) = -x^2 - 2x + 7$ , evaluate  $f(1)$ .

26. If  $f(x) = 5x^2 - 5x + 7$ , evaluate  $f\left(\frac{1}{2}\right)$ .

27. If  $f(x) = x^2 - 3x + 2$ , evaluate  $f(-3)$ .

28. If  $f(x) = -5x + 11$  and  $f(x) = 21$ , find the value of  $x$ .

**Directions: Find the domain and range of the functions represented by the graphs below.**

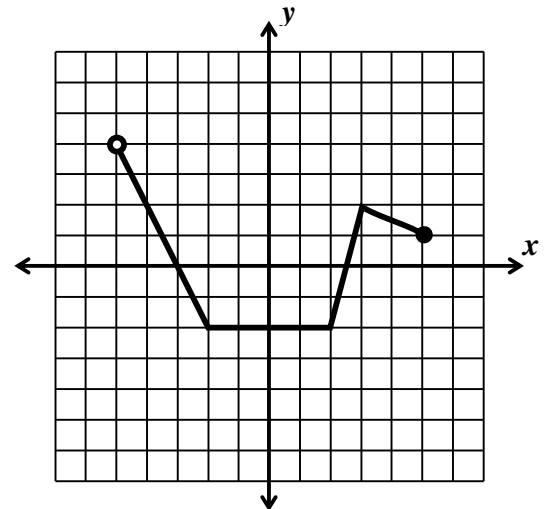
**Remember...** the domain is the set of  $x$ -values in a given relation, also known as the inputs.

**the range** is the set of  $y$ -values in a given relation, also known as the outputs.

29. Fill in the blanks to identify the domain and range of the graph.

Domain: \_\_\_\_\_  $< x \leq$  \_\_\_\_\_

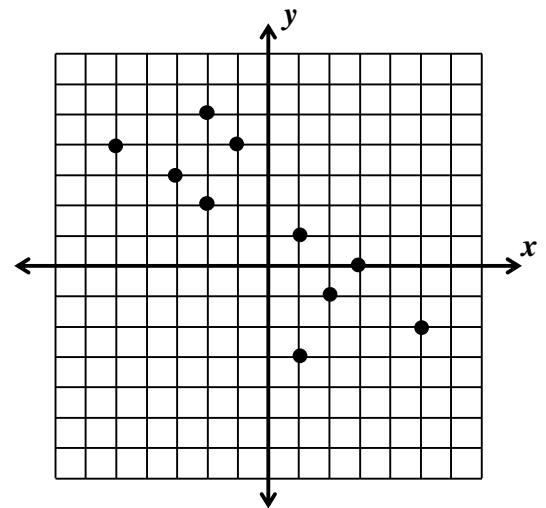
Range: \_\_\_\_\_  $\leq y <$  \_\_\_\_\_



30. Find the domain and range of the graph to the right.

Domain: \_\_\_\_\_

Range: \_\_\_\_\_



## Section IV: Linear Functions

### Three Forms of a Linear Equation

Standard Form:  $ax + by = c$

Slope-Intercept Form:  $y = mx + b$

Point-Slope Form:  $(y - y_1) = m(x - x_1)$

Need additional help?

Check out videos here → <https://www.khanacademy.org/math/algebra/two-var-linear-equations>

### Slope

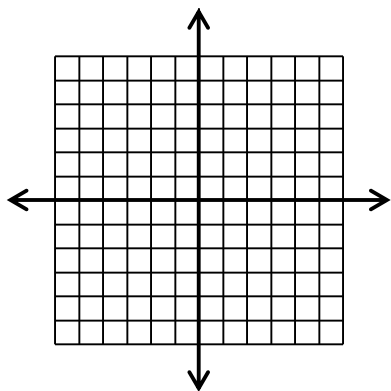
Given two points:  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Graphically  $slope = \frac{rise}{run}$

31. What is a function?

32. Graph the following, list the domain and range and determine which one is a function:

a)  $y = 4$

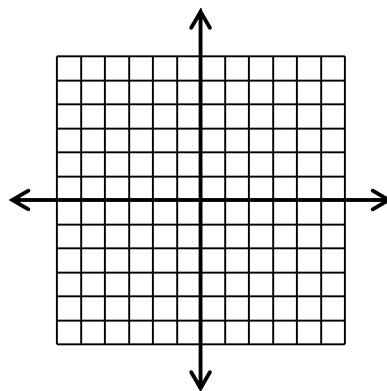


Function? \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

b)  $x = -2$

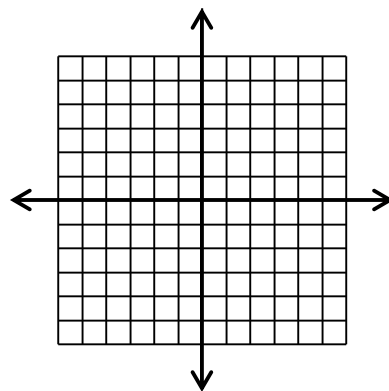


Function? \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

c)  $y = 2x + 4$



Function? \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

33. Find the equation of a line that contains the points  $(5, -1)$  and  $(7, -2)$ .

34. Transform  $y = \frac{2}{3}x - 4$  in standard form.

35. Use point-slope form to find the equation of a line in standard form with slope  $= \frac{1}{4}$  and point  $(8, -2)$  and give your answer in standard form.

36. Find the equation of a line that generates the following data:

$x$	$y$
2	8
3	12
4	16
5	20

37. Give the equation of a horizontal line that contains the point  $(-3, 5)$ .

38. Give the equation of a vertical line that contains the point  $(-3, 5)$ .

39. Find the slope of the line with the following equations:

a)  $4x - 5y = 12$

b)  $y = 7$

c)  $x = 0$

40. Write any equation for a line in standard form that has a slope of  $\frac{5}{4}$ .

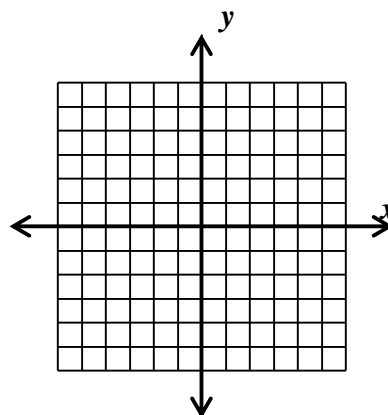
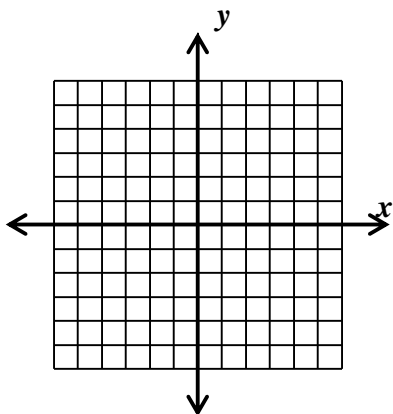
41. Find the equation of a line that is parallel to  $2x - 5y = 11$  and contains the point  $(7, 9)$ .

42. Find the equation of a line that is perpendicular to  $y = \frac{5}{4}x + 4$  that contains the point  $(-6, 5)$ .

43. Graph the equations

a)  $y = \frac{-2}{3}x + 2$

b)  $9x - 3y = 6$





44. John left his equation in point slope form and got  $y + 3 = 4(x - 2)$ . What are the coordinates of the point and slope that he used to write the equation?

45. What are the equations for the graphed lines?

