

SLOPE – INTERCEPT FORM, STANDARD FORM, AND DOMAIN & RANGE

Learning Targets:

1. Write and graph equations in slope-intercept form
2. Write and graph equations in standard form.
3. Write and graph equations of horizontal and vertical lines.
4. Write linear equations from context in slope-intercept or standard form
5. Find the domain and range of a function from a graph or of a linear function with restrictions given.

Example 1: If a line goes through the point (0, 5) and has a slope of 2, write the equation of the line in point – slope form.

Example 2: Using your answer to the last example, write y as a function of x and simplify completely.

Slope – Intercept Form

The slope intercept form of a linear equation is _____.

where $m =$ _____ (rate of change), and $b =$ _____ (initial quantity)

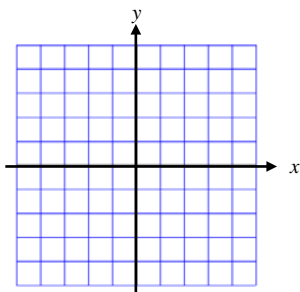
(Note: Your book uses the letter a instead of m because that's what your calculator uses ...

It's just a symbol ... you could write the equation as $y = \odot x + \heartsuit$)

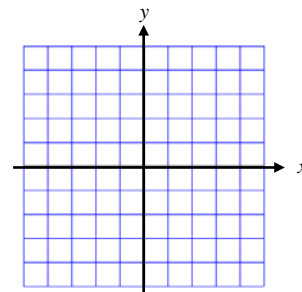
Example 3: If the y – intercept of a line is -7 , and the slope is 12, write the equation of the line in slope – intercept form.

Example 4: Graph the following equations on the graphs provided.

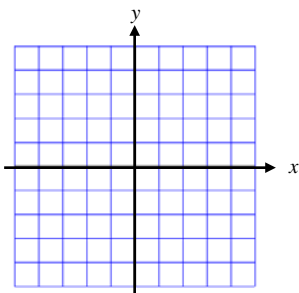
a) $y = \frac{3}{4}x - 4$



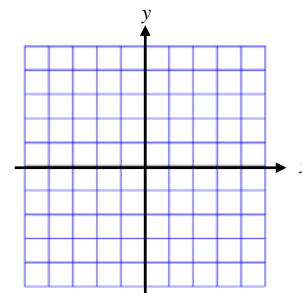
b) $y = -\frac{2}{3}x + 1$



c) $y = 2x$



d) $y = \frac{1}{2}x + \frac{3}{2}$

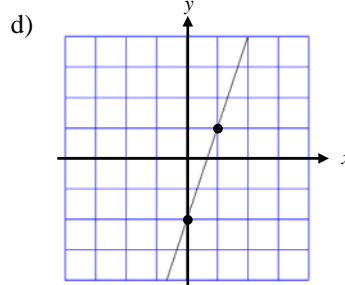


Example 5: For each of the following, write the equation of the line with the given information in slope – intercept form.

a) Point $(-4, 6)$; Slope = -1

b) Point $(2, 2)$; y – intercept = 10

c) Points (12, 0) and (6, 3) are on the line.



More with Slope

The two charts below illustrate two lines that we have not discussed thus far.

	HORIZONTAL Lines	VERTICAL Lines
Picture		
Slope		
Equation of Line		

Example 6: Using the point (3, -2), write the equation of the line that

- a) passes through the point and has a slope of 0.
- b) passes through the point and has no slope.

Standard Form of a Linear Equation

When all the variables in an equation are on the LEFT side, and all the constants are on the RIGHT side, an equation is in standard form. For a linear equation, this looks like

$$Ax + By = C$$

where the coefficients A , B , and C are _____.

When you need to write an equation in standard form you should start in one of the other two forms, then rewrite it.

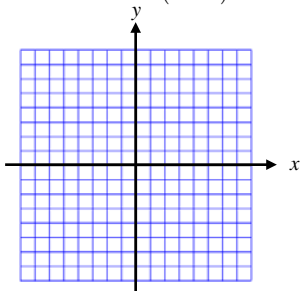
Example 7: Rewrite the following equations in Standard Form:

a) $y = \frac{2}{3}x + 5$

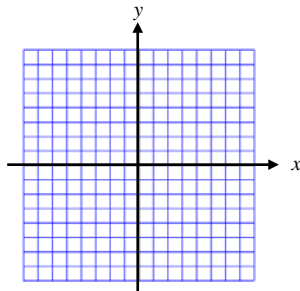
b) $y - 4 = -\frac{1}{2}(x + 2)$

Example 8: Each equation below is in a different form. Graph each equation.

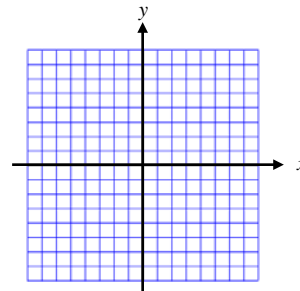
a) $y - 2 = 3(x - 1)$



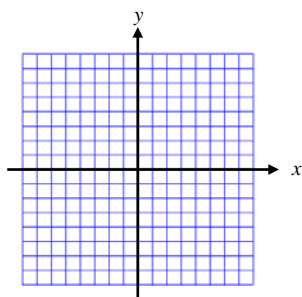
b) $y = 3x + 4$



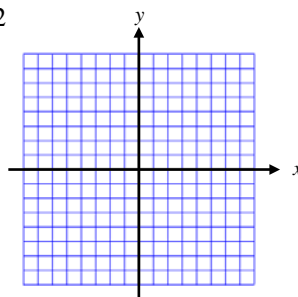
c) $2x + 3y = 6$



d) $y = 7$



e) $x = -2$



Domain and Range (Also known as the Independent and Dependent Variables)

When you first learned to graph lines, you made an INPUT/OUTPUT table. The input you used for _____, and the output was _____.

The Domain of a function is just another word for the INPUT. The **domain** is all the possible values of x you are allowed to use. For now, many of the functions we will use have a domain that is the set of all real numbers, or _____ for short. You should determine whether or not there are some numbers that can be eliminated from the domain of a function.

The domain of a function can be restricted by ...

1. Explicitly limiting the domain by stating the domain in the problem.

Example: Consider $y = 2x - 4$ if $x \leq 2$. What is the domain? _____

2. The context of a problem.

Example: You need to complete a project and are trying to determine the total cost. You have \$2000 in startup costs, and have promised each person you hire \$50 for their help.

- a) Write an equation that models your total cost as a function of the number of people you hire.

- b) What would the domain of this function be? _____

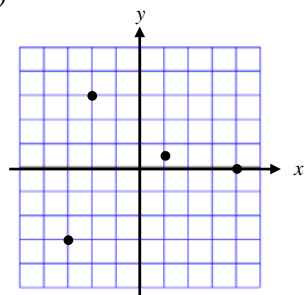
3. The function itself.

Example: Consider $y = \sqrt{x}$. What is the domain? _____

The **range** of a function then is all the possible _____ you obtain when using all the numbers in the domain. Many times the range is easier to find using a graph.

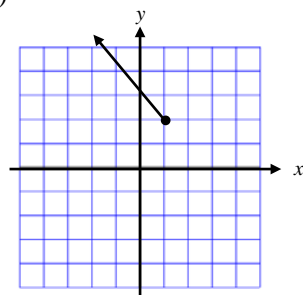
Example 9: Find the domain and range of each graph below.

a)



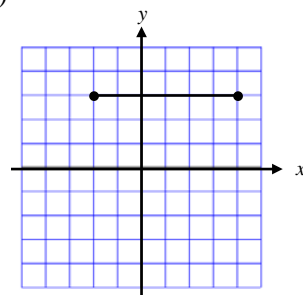
Domain: _____
Range: _____

b)



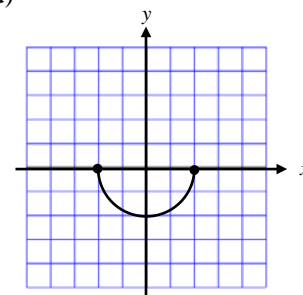
Domain: _____
Range: _____

c)



Domain: _____
Range: _____

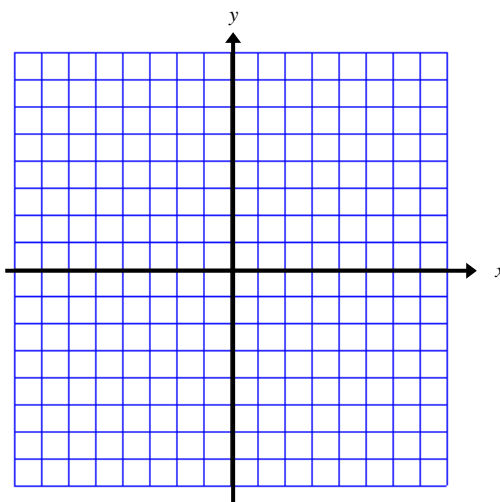
d)



Domain: _____
Range: _____

Example 10: Graph each of the following linear equations. State the Domain and Range.

a) $y = -\frac{2}{3}x + 4$ if $x > 2$.



b) $y - 2 = \frac{1}{4}(x - 1)$ if $x \leq 4$.

