

# Algebra 1 - Unit 4 Guide

## Slope, Y-intercepts, Writing and Graphing Equations

Everything you need to know for this unit!

SLOPE		SLOPE-INTERCEPT FORM
Given a graph	$\frac{\text{rise}}{\text{run}}$	$y = mx + b$
Given two points	$(x_1, y_1)$ and $(x_2, y_2)$ $m = \frac{y_2 - y_1}{x_2 - x_1}$	$m = 2$ y-intercept = $(0, 3)$ $y = 2x + 3$
Given an equation	$y = \frac{1}{2}x - 3$ <p>Since it's in <math>y = mx + b</math> form, we can easily see that the slope is <math>\frac{1}{2}</math>.</p> <p>***If the equation is not solved for <math>y =</math> you must solve for <math>y</math>***</p>	

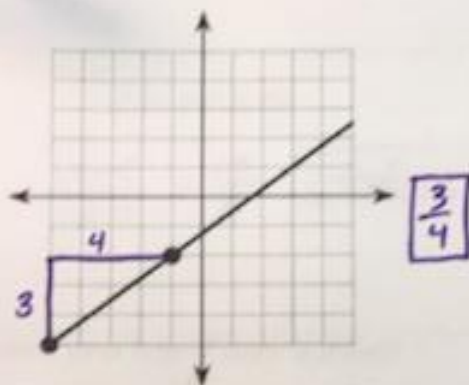
POINT-SLOPE FORM	PARALLEL AND PERPENDICULAR LINES
$y - y_1 = m(x - x_1)$ <p style="text-align: center;">slope ↓</p> <p style="text-align: center;">coordinates of a point on the line</p> <p>***Sometimes, we will need to solve this equation for <math>y =</math>***</p>	<p>Parallel lines have the SAME slope.</p> <p>Perpendicular lines have an OPPOSITE, RECIPROCAL slope.</p> <p>Use <math>y - y_1 = m(x - x_1)</math> after figuring out slope and using the point given. We usually then solve this for <math>y =</math> to put into slope-intercept form.</p>

# Algebra 1 - Unit 4 Study Packet

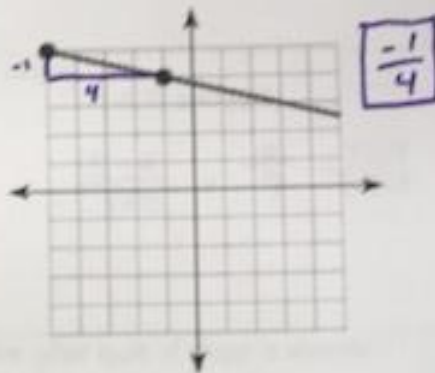
## Slope, Y-intercepts, Writing and Graphing Equations

### Skill #1 - Finding Slope

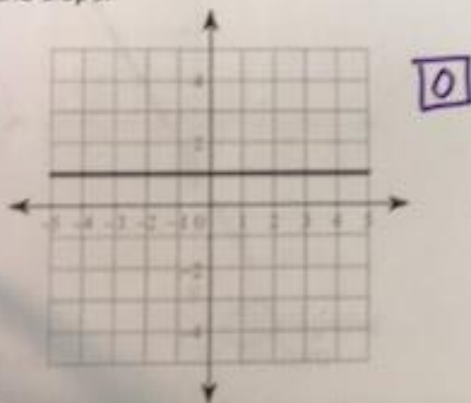
1. Find the slope:



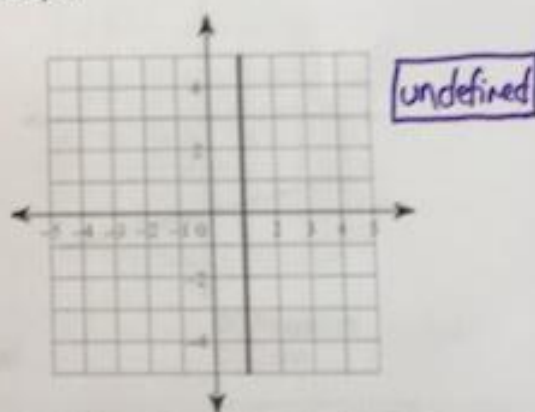
2. Find the slope:



3. Find the slope:



4. Find the slope:



5. Find the slope:

$$y = -\frac{5}{4}x + 3$$

$$m = -\frac{5}{4}$$

6. Find the slope:

$$y = \frac{1}{4}x - 4$$

$$m = \frac{1}{4}$$

7. Find the slope:

$$\begin{array}{r} 7x + 2y = -28 \\ -7x \quad -7x \\ \hline 2y = -7x - 28 \\ \frac{2y}{2} = \frac{-7x - 28}{2} \end{array}$$

← solved for y

$$y = -\frac{7}{2}x - 14$$

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

← slope

8. Find the slope:

$$\begin{array}{r} x - 2y = 7 \\ -x \quad -x \\ \hline -2y = -x + 7 \\ \frac{-2y}{-2} = \frac{-x + 7}{-2} \end{array}$$

← solved for y

$$y = \frac{1}{2}x + \frac{7}{2}$$

$$m = \frac{1}{2}$$

← slope

9. Find the slope:

(3,4) and (-4,-5)

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 4}{-4 - 3} = \frac{-9}{-7} = \boxed{\frac{9}{7}}$$

10. Find the slope:

(11,-18) and (-1,-7)

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-7 - (-18)}{-1 - 11} = \frac{11}{-12}$$

11. Find the slope:

(2,4) and (2,-1)

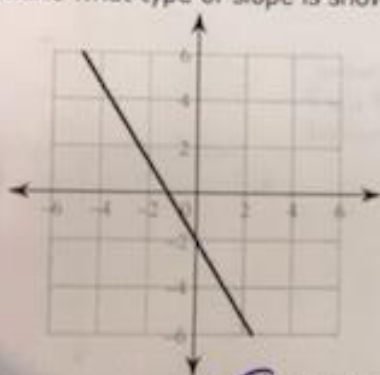
$$\frac{-1 - 4}{2 - 2} = \frac{-5}{0} = \boxed{\text{undefined}}$$

12. Find the slope:

(-4,5) and (3,5)

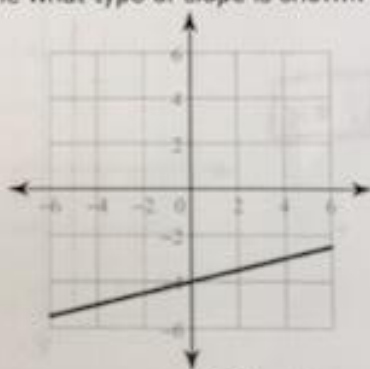
$$\frac{5 - 5}{3 - (-4)} = \frac{0}{7} = \boxed{0}$$

13. Determine what type of slope is shown:



- A) Positive  
C) Undefined  
 B) Negative  
D) Zero

14. Determine what type of slope is shown:



- A) Positive  
C) Undefined  
B) Negative  
D) Zero

15. What is the **y-intercept** of the graph of the following equation?

$$y = mx + b$$
$$y = -4x - 10$$

$$\boxed{-10}$$

16. What is the **y-intercept** of the graph of the following equation?

$$3x - 6y + 6 = 0$$
$$-3x \quad -3x$$
$$-6y + 6 = -3x$$
$$-6 \quad -6$$
$$-6y = -3x - 6$$
$$-6 \quad -6$$
$$y = \frac{1}{2}x + 1$$

$$\boxed{1}$$

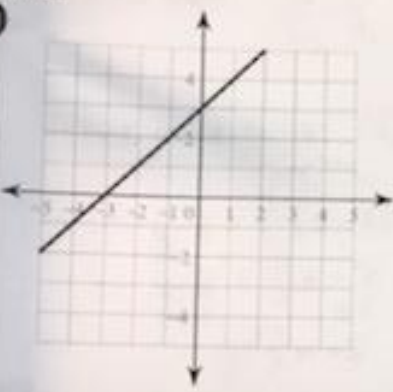
Skill #1

- I can determine the slope of a line, given the equation.
- I can determine the slope of a line, given the coordinates of two points on the line.
- I can determine the slope of a line, given the graph of a line.
- I can recognize and describe a line with a positive, negative, zero, or undefined slope.
- I can determine the y-intercept from a graph or a equation
- Need more practice (IXL - S.2, S.3, S.5)



Skill #2 - Writing Equations

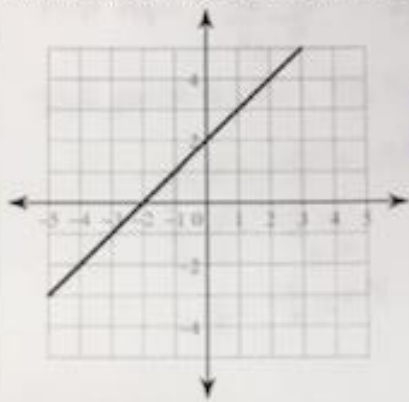
1. Write slope-intercept form of the equation of the line:



$$y = 1x + 3$$

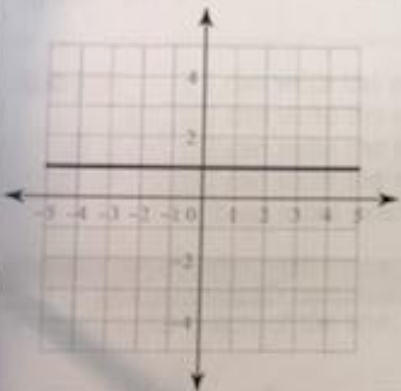
$$\boxed{y = x + 3}$$

2. Write slope-intercept form of the equation of the line:



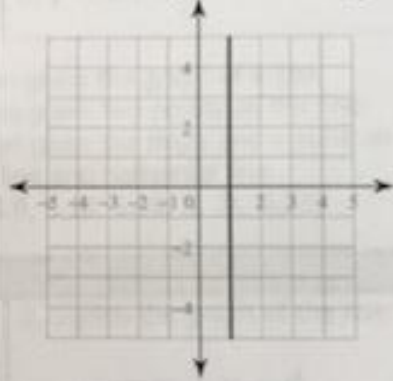
$$\boxed{y = x + 2}$$

3. Write the equation for the given line:



$$\boxed{y = 1}$$

4. Write the equation for the given line:



$$\boxed{x = 1}$$

5. Write the equation of the line with a slope of 4 and y-intercept of -3.

$$\boxed{y = 4x - 3}$$

6. Write the equation of the line with a slope of  $-\frac{3}{5}$  and y-intercept of 5.

$$\boxed{y = -\frac{3}{5}x + 5}$$

7. Write the slope-intercept form of the equation of a line with a slope of 2 and passing through the point (2, -5).

$$y + 5 = 2(x - 2)$$

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

$$y = 2x - 9$$

$$\boxed{y = 2x - 9}$$

7. Write the slope-intercept form of the equation of a line with a slope of  $-\frac{1}{5}$  and passing through the point (5, 1).

$$y - 1 = -\frac{1}{5}(x - 5)$$

$$y - 1 = -\frac{1}{5}x + 1$$

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

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

- A)  $y = 2x - 4$
- C)  $y = 2x - 9$

- B)  $y = 2x + 1$
- D)  $y = 2x + 9$

- A)  $y = -\frac{1}{5}x$
- C)  $y = -\frac{1}{5}x - 5$

- B)  $y = -\frac{1}{5}x + 2$
- D)  $y = -\frac{1}{5}x + 1$

8. Write the slope-intercept form of the equation that passes through (5,2) and (0,-5).

$$\text{Find slope: } \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 2}{0 - 5} = \frac{-7}{-5} = \frac{7}{5}$$

Pick point to use: (5,2)

$$y - 2 = \frac{7}{5}(x - 5)$$

$$y - 2 = \frac{7}{5}x - 7$$

$$\begin{array}{r} y - 2 \\ + 2 \end{array} = \frac{7}{5}x - 7 \begin{array}{r} + 7 \\ + 7 \end{array}$$

$$y = \frac{7}{5}x - 5$$

A)  $y = \frac{7}{5}x - 5$

B)  $y = \frac{7}{5}x - 7$

A)  $y = -\frac{1}{5}x - 4$

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

C)  $y = \frac{5}{7}x + 5$

D)  $y = \frac{5}{7}x + 7$

C)  $y = \frac{1}{5}x + 4$

D)  $y = -\frac{1}{5}x + 4$

9. Write the slope-intercept form of the equation that passes through (0,4) and (-4,6).

$$\text{Find slope: } \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 4}{-4 - 0} = \frac{2}{-4} = -\frac{1}{2}$$

Pick point to use: (0,4)

$$y - 4 = -\frac{1}{2}(x - 0)$$

$$y - 4 = -\frac{1}{2}x$$

$$\begin{array}{r} y - 4 \\ + 4 \end{array} = -\frac{1}{2}x \begin{array}{r} + 4 \\ + 4 \end{array}$$

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

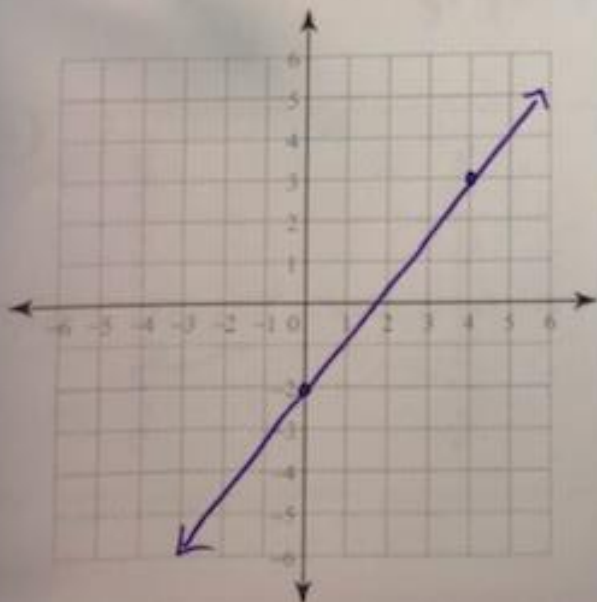
Skill #2

- I can write the equation of a line when given the graph of a line.
- I can write the equation of a line when given two points on the line.
- I can write the equation of a line when given the slope and a point on the line.
- I can write the equation of a vertical line and horizontal line.
- Need more practice (IXL - S.7, S.8, S.9, S.18, S.19, S. 21, S.22)

Skill #3 - Graphing Equations

1. Sketch the graph of the line:

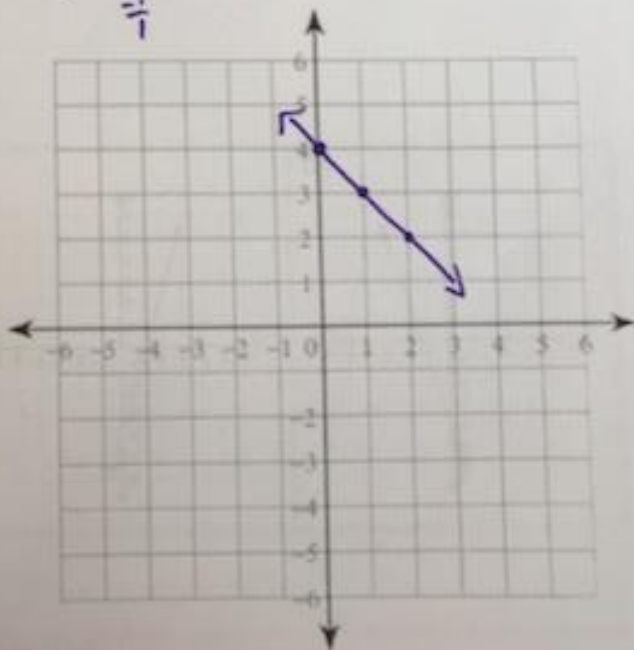
$$y = \frac{5}{4}x - 2$$



2. Sketch the graph of the line:

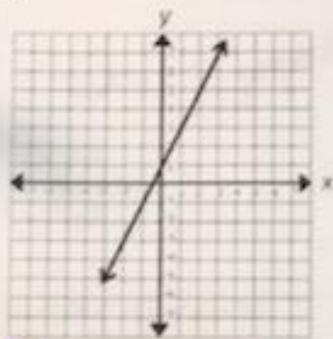
$$y = -x + 4$$

$$\frac{-1}{1}$$

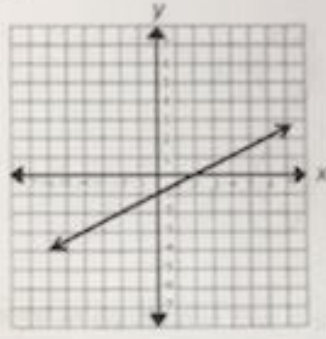


4. Which graph best represents  $y = 2x - 17$ ?

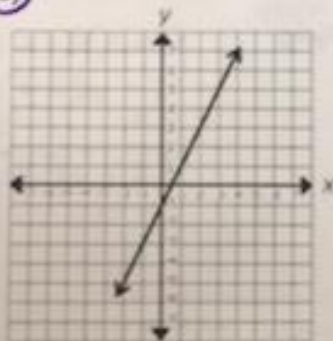
A)



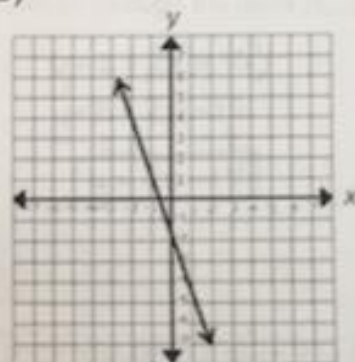
B)



C)



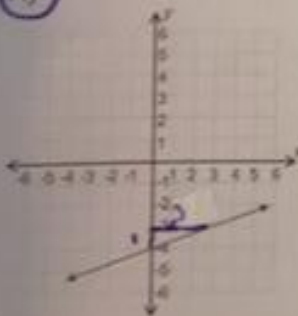
D)



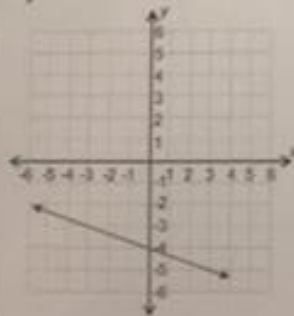
4. Which graph best represents  $x - 3y = 12$ ?

$$\begin{aligned} x - 3y &= 12 \\ -3y &= -x + 12 \\ \frac{-3y}{-3} &= \frac{-x + 12}{-3} \\ y &= \frac{1}{3}x - 4 \end{aligned}$$

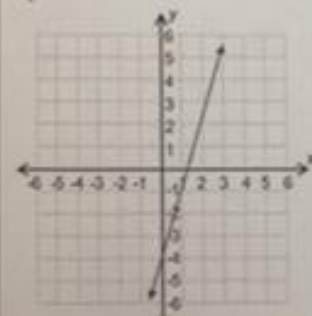
A)



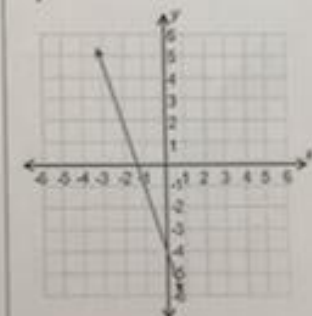
B)



C)



D)



Skill #3

- I can graph a linear equation in two variables (x,y).
- Need more practice (IXL - S.6, S.17, S.20)



Skill #4 - Parallel and Perpendicular Lines

1. Identify the lines as parallel, perpendicular, or neither.

$$y = -2x + 2$$

perpendicular

$$y = \frac{1}{2}x + 1$$

2. Identify the lines as parallel, perpendicular, or neither.

$$y = -\frac{4}{5}x - 1$$

parallel

$$y = \frac{4}{5}x - 2$$

3. Write an equation in that is parallel to  $y = -3x - 2$  and passes through the point  $(-1, 5)$ .

same slope = -3

$$y - 5 = -3(x + 1)$$

$$y - 5 = -3x - 3$$

$$y = -3x + 2$$

4. Write an equation in that is perpendicular to  $y = -\frac{1}{2}x + 8$  and passes through the point  $(6, -2)$ .

opposite reciprocal slope = 2

$$y + 2 = 2(x - 6)$$

$$y + 2 = 2x - 12$$

$$y = 2x - 14$$

Skill #4

- I can write the equation of a line parallel or perpendicular to a given line through a given point.
- Need more practice (IXL - S.23, S.24)