

# Unit 5 Lesson 1B

Tuesday

## Characteristics of Linear Relations Lesson #3: Slope of a Line Segment

A trucker driving up a hill with a heavy load may be concerned with the steepness of the hill. When building a roof, a builder may be concerned with the steepness (or pitch) of the roof. A skier going down a hill may be concerned with the steepness of the ski hill.

In mathematics, the term **slope** is used to describe the steepness of a line segment.

### Slope of a Line Segment

The slope of a line segment is a measure of the steepness of the line segment.

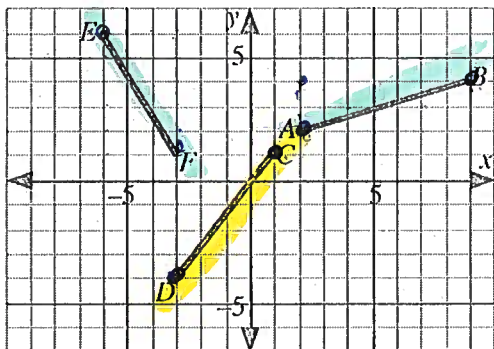
It is the ratio of **rise** (the change in vertical height between the endpoints) over **run** (the change in horizontal length between the endpoints).

$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

- the **rise** is **POSITIVE** if we count **UP**, and **NEGATIVE** if we count **DOWN**.
- the **run** is **POSITIVE** if we count **RIGHT**, and **NEGATIVE** if we count **LEFT**.



Each line segment on the grid has endpoints with integer coordinates. Complete the table below.



Line Segment	Rise	Run	Slope = $\frac{\text{Rise}}{\text{Run}}$
AB	+2	+7	$\frac{2}{7}$
CD	+5	+4	$\frac{5}{4}$
EF	-5	+3	$-\frac{5}{3}$

+5 -3

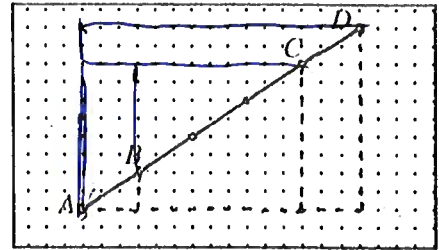
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### Investigation #1

#### Investigating the Slope of Line Segments

a) Complete the chart. Write the slopes in simplest form.

Line Segment	Rise	Run	Slope = $\frac{\text{Rise}}{\text{Run}}$
AB	2	3	$\frac{2}{3}$
AC	8	12	$\frac{8}{12} = \frac{2}{3}$
AD	10	15	$\frac{10}{15} = \frac{2}{3}$
BC	6	9	$\frac{6}{9} = \frac{2}{3}$



b) How are the slopes of the line segments related?

### Slope of a Line

The slopes of all line segments on a line are equal.

The slope of a line representing the graph of a linear relation can be found using

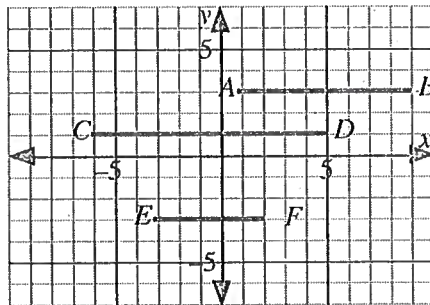
$$\text{slope} = \frac{\text{rise}}{\text{run}} \text{ for any two points on the line.}$$

### Investigation #2

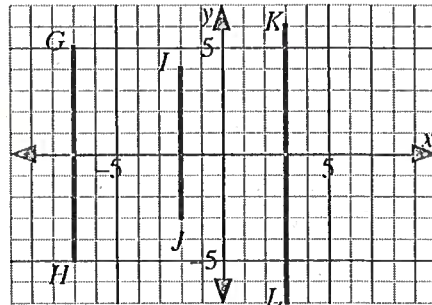
#### Slopes of Horizontal and Vertical Line Segments

Consider the line segments in Grid 1 and Grid 2 below.

Grid 1



Grid 2



a) Determine the slopes of all the line segments in Grid 1.

$$\text{all zero} = \frac{0}{\text{run}} = \frac{0}{8} = 0$$

b) Determine the slopes of all the line segments in Grid 2.

$$\frac{\text{rise}}{0} = \frac{8}{0} = \text{undefined}$$

c) Complete the following statements.

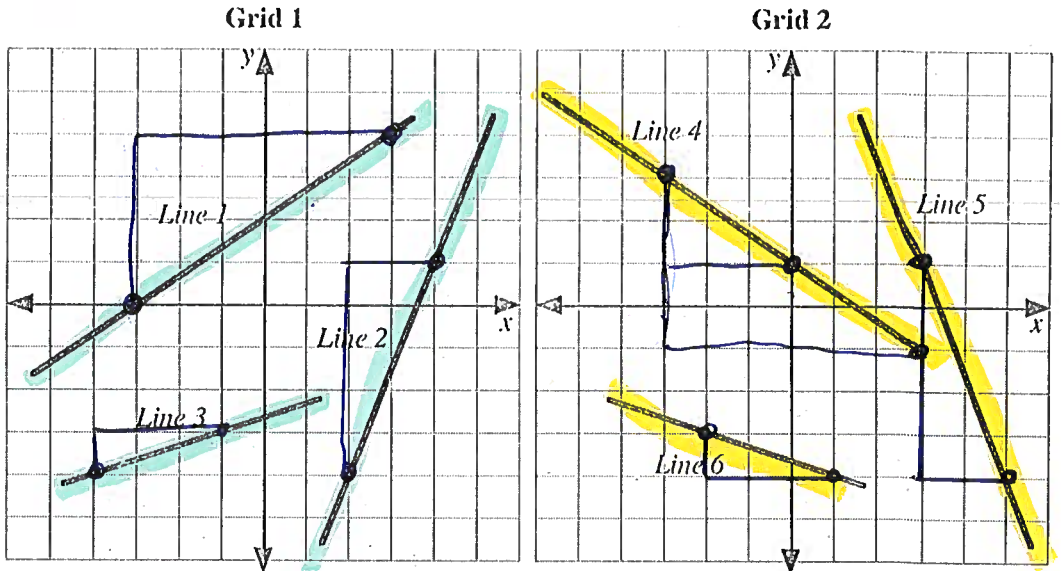
- Horizontal line segments have a slope of zero.
- Vertical line segments have an undefined slope.

**Investigation #3** Positive and Negative Slopes

- a) Each line on the grids passes through at least two points with integer coordinates. Calculate the slope of each of the lines.

**Remember on a Cartesian Plane**

- the **rise** is **POSITIVE** if we count **UP**, and **NEGATIVE** if we count **DOWN**
- the **run** is **POSITIVE** if we count **RIGHT**, and **NEGATIVE** if we count **LEFT**



**Table For Grid 1**

Line	Slope
1	$+4/6$ $2/3$
2	$+5/2$
3	$+1/3$

**Table For Grid 2**

Line	Slope
4	$-2/3$
5	$-5/2$
6	$-1/3$

- b) Compare the slopes of:
- Line 1 and Line 4
  - Line 2 and Line 5
  - Line 3 and Line 6

*the slopes are the opposite signs*

- c) Complete the following statements.

- A line which rises from left to right has a  +ve  slope.
- A line which falls from left to right has a  -ve  slope.

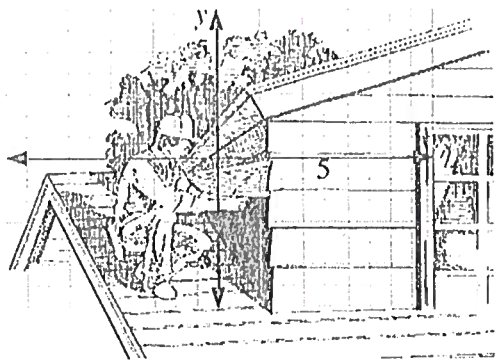
*(Handwritten arrows point from 'tve' to the first line and from '-ve' to the second line.)*

**Complete Assignment Questions #1 and #2**



A grid has been superimposed on the sketch.

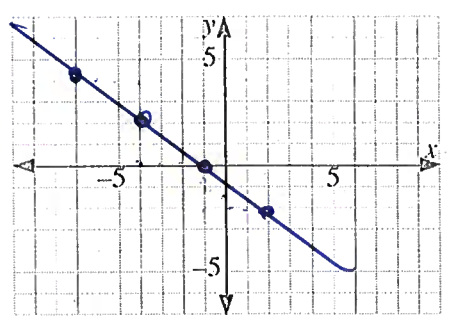
- a) Estimate the pitch (slope) of the roof to the right of the worker's head.
- b) Could the grid be used to estimate the pitch of the roof the worker is standing on? Explain.



Draw a line segment on the grid which passes through the point  $(-4, 2)$  and has a slope of  $-\frac{2}{3}$ . The line segment must be long enough to cross both the  $x$ -axis and the  $y$ -axis.

Write the coordinates of three other points on the line segment which have integer coordinates.

$$-\frac{2}{3} \begin{matrix} \downarrow \\ -2 \\ \rightarrow 3 \end{matrix} \quad \begin{matrix} 2 \uparrow \\ -3 \leftarrow \end{matrix}$$



$x$ intercept =  $-1$   
 $y$ intercept =  $-1$



A line segment has a slope of  $-\frac{5}{7}$  and a rise of 12. Calculate the run as an exact value.

~~Complete Assignment Questions #3-#13~~

**The Slope Formula**

In mathematics the letter "m" is used to represent slope. If the graph of a linear relation passes through the points  $P(x_1, y_1)$  and  $Q(x_2, y_2)$ , then the slope of this line can be calculated using

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{or} \quad m_{PQ} = \frac{y_Q - y_P}{x_Q - x_P}$$



Find the slope of a line which passes through the points  $G(-3, 8)$  and  $H(7, -2)$ .

$$m_{GH} = \frac{y_H - y_G}{x_H - x_G} =$$

$$\frac{-10}{10} = -\frac{1}{1}$$

~~$$\frac{y_2 - y_1}{x_2 - x_1} =$$~~

$$\frac{y_2 - y_1}{x_2 - x_1} =$$

$$\frac{-2 - 8}{7 - (-3)}$$



Eleanor, Bonnie, and Carl are calculating the slope of a line segment with endpoints  $E(15, 8)$  and  $F(-10, 6)$ . Their work is shown below.

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	Eleanor	Bonnie	Carl
Step 1:	$m_{EF} = \frac{-10 - 15}{6 - 8}$	$m_{EF} = \frac{6 - 8}{15 - (-10)}$	$m_{EF} = \frac{8 - 6}{15 - 10}$
Step 2:	$= \frac{-25}{-2}$	$= \frac{-2}{25}$	$= \frac{2}{5}$
Step 3:	$m_{EF} = \frac{25}{2}$	$m_{EF} = -\frac{2}{25}$	$m_{EF} = \frac{2}{5}$

Since their answers are all different, at least two of the students have made errors in their calculations. Describe all the errors which have been made and determine the correct slope.

Eleanor = run instead of rise  
rise

Bonnie = ~~flipped~~ flipped coordinates

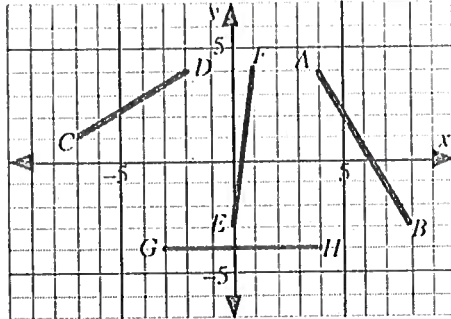
Carl = used +10 instead of -10

$$\begin{aligned} \text{slope} &= \frac{6 - 8}{-10 - 15} \\ &= \frac{-2}{-25} = \frac{2}{25} \end{aligned}$$

~~Assignment Questions #1-5~~

## Assignment

- 1 Each line segment on the grid has endpoints with integer coordinates. Complete the table.



Line Segment	Rise	Run	Slope = $\frac{\text{Rise}}{\text{Run}}$
AB			
CD			
EF			
GH			

- 2 Every line on the grid passes through at least two points with integer coordinates. Calculate the slope of each of the lines.

slope of Line 1 :

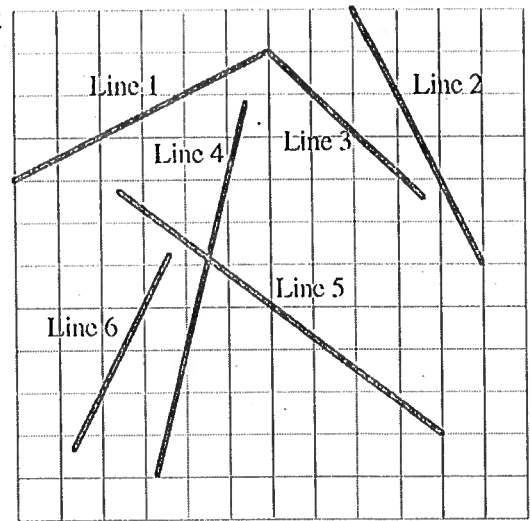
slope of Line 2:

slope of Line 3:

slope of Line 4:

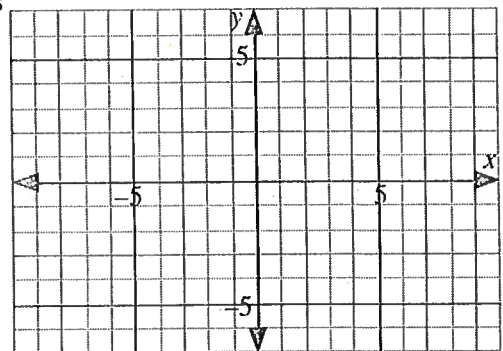
slope of Line 5:

slope of Line 6:



- 3 Draw a line segment on the grid which passes through the point  $(-5, -2)$  and has a slope of  $\frac{2}{3}$ . The line segment must be long enough to cross both the  $x$ -axis and the  $y$ -axis.

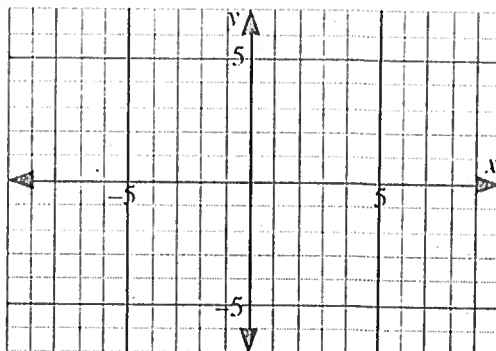
Write the coordinates of three other points on the line segment which have integer coordinates.



4. Repeat question #3 for line segments with the given slope passing through the given point.

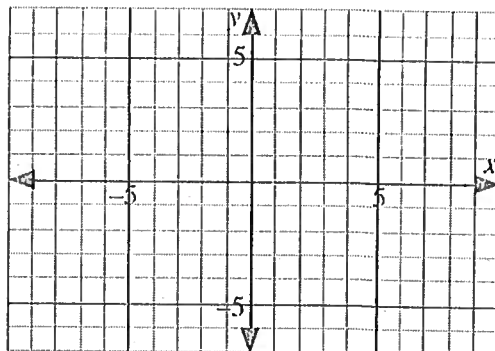
a) slope =  $\frac{2}{5}$ , (2, 1)

b) slope =  $-\frac{1}{3}$ , (6, -3)



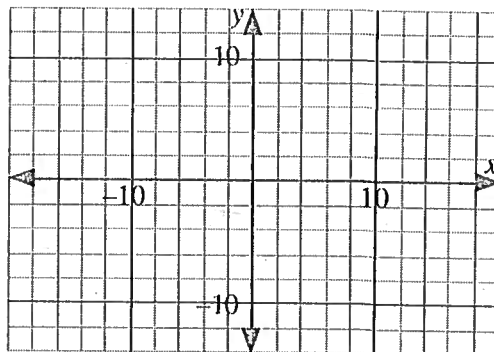
c) slope =  $-\frac{4}{3}$ , (-9, 6)

d) slope = 4, (0, -7)



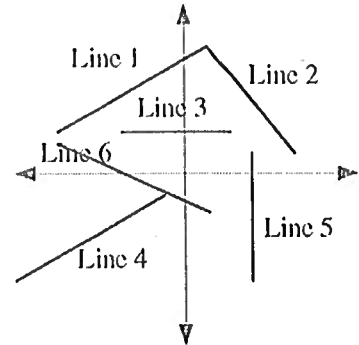
e) slope = -2, (4, -12)

f) slope = 0, (0, 6)



## Assignment

1. State whether the slope of each line is positive, negative, zero, or undefined.



2. Use the slope formula to calculate the slope of the line segment with the given endpoints.

a)  $A(12, -2)$  and  $B(0, 3)$

b)  $C(-2, 3)$  and  $D(2, -2)$

$$m_{AB} = \frac{y_B - y_A}{x_B - x_A} =$$

c)  $P(-15, -2)$  and  $O(0, 0)$

d)  $S(36, -41)$  and  $T(-20, -27)$

e)  $U(-172, -56)$  and  $V(-172, 32)$

f)  $K(8, -41)$  and  $L(397, -41)$

3. Use the slope formula to calculate the slope of the line passing through the given points.

a)  $(3, -6)$  and  $(8, 4)$

b)  $(-12, 7)$  and  $(0, -2)$

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

c)  $(-3, -8)$  and  $(1, 5)$

d)  $(21, 1)$  and  $(-4, -9)$



**Answer Key**

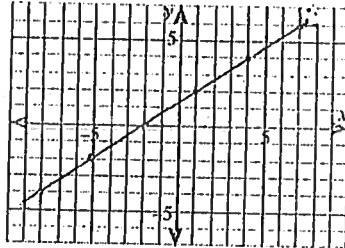
1.

Line Segment	Rise	Run	Slope = $\frac{\text{Rise}}{\text{Run}}$
AB	-7	4	$-\frac{7}{4}$
CD	3	5	$\frac{3}{5}$
EF	7	1	$\frac{7}{1} = 7$
GH	0	7	$\frac{0}{7} = 0$

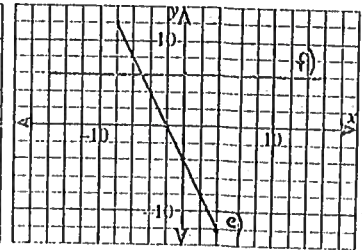
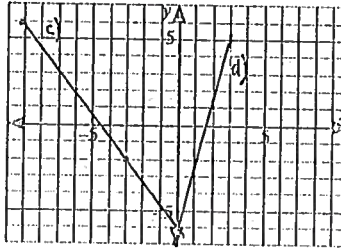
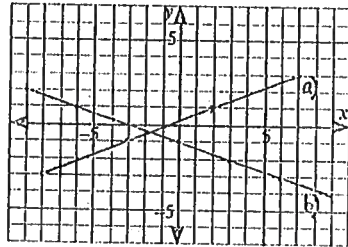
2. slope of line 1 =  $\frac{1}{2}$ , slope of line 2 = -2, slope of line 3 = -1

slope of line 4 = 4, slope of line 5 =  $-\frac{3}{4}$ , slope of line 6 = 2

3. Any three of (-8, -4), (-2, 0), (1, 2), (4, 4)



4.



a) (-8, -3), (-3, -1), (7, 3)

c) (-6, 2), (-3, -2), (0, -6)

e) Many possible answers including (2, -8), (0, -4), (-2, 0)

b) Any 3 of (-9, 2), (-6, 1), (-3, 0)  
(0, -1), (3, -2), (9, -4)

d) (1, -3), (2, 1), (3, 5)

f) Many possible answers including (1, 6), (2, 6), (3, 6)

**Answer Key**

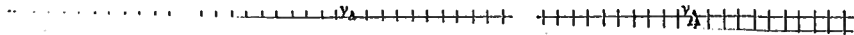
1. Line 1 - positive, Line 2 - negative, Line 3 - zero, Line 4 - positive, Line 5 - undefined, Line 6 - negative

2. a)  $-\frac{5}{12}$       b)  $-\frac{5}{4}$       c)  $\frac{2}{15}$       d)  $-\frac{1}{4}$       e) undefined      f) 0

3. a) 2      b)  $-\frac{3}{4}$       c)  $\frac{13}{4}$       d)  $\frac{2}{5}$

4. a)  $\frac{15}{4}$       b)  $(9, \frac{49}{2})$       c) 46.6 m.

5. a)  $k = 9$       b)  $k = -7$       c)  $k = -5$



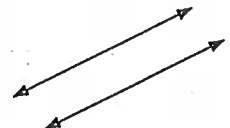
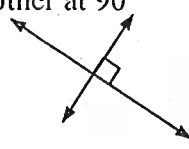


# Unit 5 Linear Functions

## Lesson #2:

### Parallel and Perpendicular Slopes

First, let's remember the definition of parallel and perpendicular lines from Grade 8:

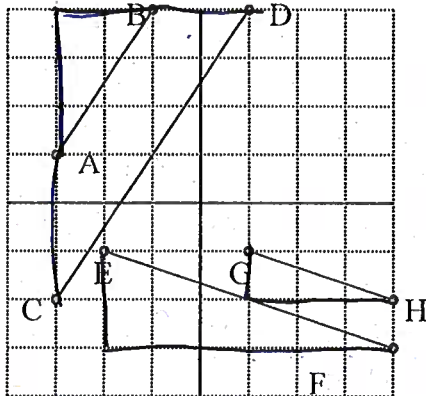
<p><b>Parallel Lines:</b> Two lines that are in the same plane, and never touch</p> 	<p><b>Perpendicular Lines:</b> Two lines that meet each other at 90°</p> 
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**Parallel Lines:**

In the space provided, find the slopes of the pairs of lines. What do you notice about their slopes?

Slope of AB    Slope of CD

$$\frac{+3}{2} \quad \frac{+6 \div 2}{4 \div 2} = \frac{3}{2}$$



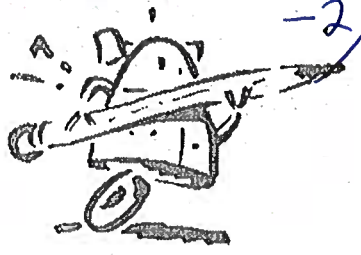
~~not parallel~~  
 $\frac{1}{3}$      $-\frac{1}{3}$

Slope of EF    Slope of GH

$$\frac{-2}{6} = -\frac{1}{3} \quad -\frac{1}{3}$$

$$\frac{-2 \div 2}{6 \div 2} = -\frac{1}{3} = -\frac{1}{3}$$

★ Sign has to be the same  
 ∞ parallel



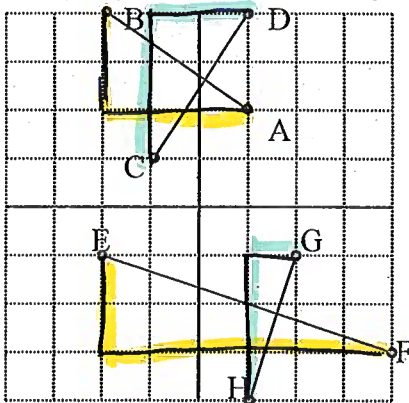
So, AB is parallel to CD, and their slopes are equal.  
 Also, EF is parallel to GH, and their slopes are equal.

**Perpendicular Lines:**

In the space provided, find the slopes of the pairs of lines. What do you notice about their slopes?

Slope of AB    Slope of CD

$$\frac{-2}{3} \quad + \frac{3}{2}$$



example

$$\frac{-3}{4} \quad \frac{4}{3}$$

$$\frac{6}{1} \quad \frac{-1}{6}$$

Slope of EF    Slope of GH

$$\frac{-2}{6} = -\frac{1}{3} \quad = \frac{3}{1}$$

So, AB is perpendicular to CD, and their slopes are negative reciprocals.  
 Also, \_\_\_\_\_ is perpendicular to \_\_\_\_\_, and their slopes are negative reciprocals.

$$\frac{4}{6} \quad \frac{2}{3}$$



- So, when lines are parallel, their slopes are equal  
 - And, when lines are perpendicular, their slopes are negative (opposite) and recip. (flipped)

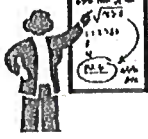


Ex 1: Slopes of lines a, b, and c are given below. Lines a and b are parallel, while line c is perpendicular. Fill in the chart below:

Slope of Line a	Slope of Line b	Slope of Line c
$\frac{2}{5}$	$+2/5$	$-5/2$
$-10/3$	$-3\frac{1}{3}$	$3/10$
$-1/7$	$-1/7$	$7/1$

para. Perpen. Reciprocal

$$\frac{2}{5} \perp -\frac{10}{4}$$



Ex 2: Determine the slopes of each pairs of lines. Then, state if the lines are parallel, or perpendicular:

a) W(7,0) X(-5,9) and A(2,10) B(-7,-2)

b) S(-2,-1) T(1,5) and U(2,-1) V(4,3)

$$\frac{9-0}{-5-7} = \frac{9}{-12} = \frac{-3}{4}$$

$$\frac{-2-10}{-7-2} = \frac{-12}{-9} = \frac{4}{3}$$

$$\frac{-3}{4} \neq \frac{4}{3}$$

$$\frac{5-(-1)}{1-(-2)} = \frac{6}{3} = 2$$

$$\frac{3-(-1)}{4-2} = \frac{4}{2} = 2$$



Ex 3: Determine the value of k which obeys the following conditions:

a. The slopes of parallel line segments are  $\frac{3}{8}$  and  $\frac{9}{k}$

$$\frac{3}{8} = \frac{9}{k} \quad (9 \times 8) \div 3 = 24$$

$$\frac{3}{8} = \frac{9}{k} \quad k = 24$$

b. The slopes of perpendicular line segments are  $\frac{1}{3}$  and  $\frac{k}{5}$

$$\frac{1}{3} \perp \frac{k}{5} = -15$$

$$\frac{-3}{1} = \frac{k}{5}$$

**Assignment:**

1. The slopes of several line segments are given below.

$$\text{slope of AB} = 2 \quad \text{slope of JK} = \frac{1}{2} \quad \text{slope of MN} = -2 \quad \text{slope of XY} = -\frac{1}{2}$$

$$\text{slope of GH} = \frac{3}{6} \quad \text{slope of CD} = -0.5$$

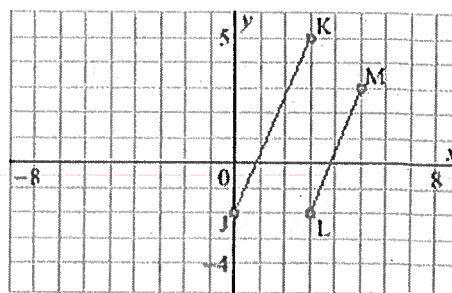
a) Which line segments are parallel? Show why.

b) Which line segments are perpendicular? Show why.

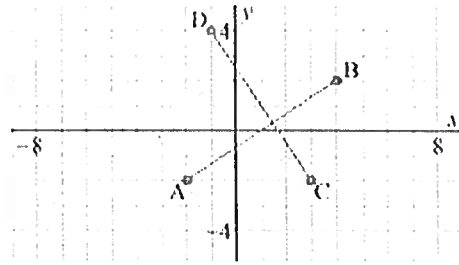
2. Line segment  $a$  is parallel to line segment  $b$  and perpendicular to line segment  $c$ . Use this information to complete the chart below.

Slope of $a$	Slope of $b$	Slope of $c$
$\frac{2}{5}$		
$-\frac{1}{7}$		
	$-8$	
	$2\frac{3}{4}$	
		$-\frac{5}{9}$
		$10$
$0$		

3. Two line segments that appear to be parallel are shown. Calculate the slopes of the line segments and determine if they are parallel.



4. Two line segments that appear to be perpendicular are shown. Calculate the slopes of the line segments and determine if they are perpendicular.



5. Determine the slope of each line segment with endpoints given below. Identify which line segments are parallel and which are perpendicular.

i) A(5, 3), B(0, 0)

ii) C(6, -1), D(1, 2)

iii) E(-5, -8), F(-2, -6)

iv) G(-4, 3), H(-1, -2)

v) J(2, 7), K(-1, 5).

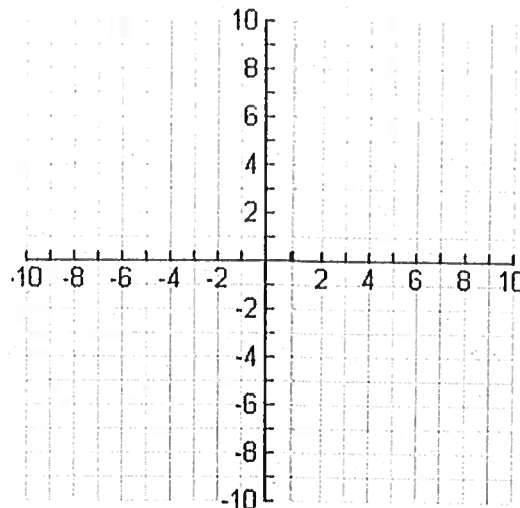
6. Determine the value of the variable that satisfies each condition.

a) The slopes of parallel line segments are  $\frac{3}{5}$  and  $\frac{k}{10}$

b) The slopes of perpendicular line segments are  $\frac{1}{3}$  and  $\frac{k}{2}$

7. To help her map out an arrangement for a flowerbed for her front yard, Verna used a coordinate grid. The corners of the flowerbed were represented by the coordinates  $A(0,8)$ ,  $B(4,9)$ ,  $C(6,1)$ , and  $D(2,0)$ .

a) Plot the points on a coordinate grid and connect them with line segments.



b) Calculate the slopes of all four line segments. (AB, BC, CD, DA)

c) What shape is Verna's flowerbed?

**Answer Key:**

1a) JK and GH, XY and CD

1b) AB and XY, AB and CD, MN and JK, MN and GH

2)  $2/5, -5/2, -1/7, 7, -8, 1/8, 11/4, -4/11, 9/5, 9/5, -1/10, -1/10, 0, \text{und.}$

3) 2.3', 2.5, not parallel

4)  $2/3, -3/2$ , perpendicular

5i)  $3/5$  ii)  $-3/5$  iii)  $2/3$  iv)  $-5/3$  v)  $2/3$  par: EF JK, perpendicular: AB GH

6a) 6

6b) -6

7b) AB:  $1/4$  BC -4 CD  $1/4$  DA -4

c) rectangle

8) D





# Unit 5 Linear Functions

## Lesson #4:

### Slope-Intercept Form

slope  $\downarrow$   $y$ -int  $\downarrow$   
 $y = mx + b$

$$3y = 9 - 3x$$

If the  $y$  is not by itself, we can *manipulate* the equation to get it there. Try these: Solve for  $y$ :

a.  $3x + 3y - 9 = 0$

$$\begin{aligned} -3x & & -3x \\ 3y - 9 & = -3x \\ \downarrow + 9 & & + 9 \end{aligned}$$

$$\frac{3y}{3} = \frac{-3x}{3} + \frac{9}{3} \Rightarrow y = -x + 3$$

b.  $5x + 2y = 10$

$$\begin{aligned} & & + 2y \\ 5x & = 10 - 2y \\ \downarrow - 2y & & - 2y \end{aligned}$$

$$5x = 10 - 2y \Rightarrow y = \frac{5x - 10}{2}$$

c.  $7x - 3y + 5 = 0$

$$\begin{aligned} 5x - 10 & = 2y \\ \frac{2y}{2} & = \frac{5x - 10}{2} \end{aligned}$$

$$y = \frac{5x - 10}{2}$$



When the  $y$  is by itself, the equation is said to be in *slope-intercept form*: We give it the general form:

$$y = mx + b$$

slope  $\downarrow$   $y$ -int  $\downarrow$

Where the number in front of the  $x$  ( $m$ ) represents the slope, and the number behind the  $x$  ( $b$ ) represents the  $y$ -intercept of the lines

To show this, graph the line below, and find the  $x$ - and  $y$ - intercepts. Then find the slope

using the equation  $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$y = -3x + 9$$

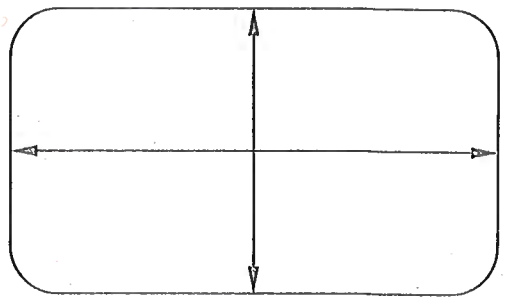
$x$ -intercept:

$$\begin{aligned} 0 & = -3x + 9 \\ -9 & & -9 \\ -9 & = -3x \\ \frac{-9}{-3} & & \frac{-9}{-3} \end{aligned} \Rightarrow x = 3$$

Slope:

$y$ -intercept:

$$\begin{aligned} & + 9 \\ y & = -3(0) + 9 \\ & y = 9 \end{aligned}$$



So, the number in front of the  $x$  is slope, and the slope is -3/1. Also, the number behind the  $x$  is +9, and the  $y$ -intercept is +9.

\*\* So, now you **don't** need to graph an equation to find its slope and  $y$ -intercept. All you need to do is have the equation in *slope-intercept form*. \*\*

Ex 1: Determine the slope and  $y$ -intercept of the following lines *without* graphing:

a.  $y = 5x - 2$

slope:  $\frac{5}{1}$   
 $y$ -int:  $-2$

b.  $6x + 2y - 10 = 0$

$$\begin{aligned} -6x & & -6x \\ 2y - 10 & = -6x \\ \downarrow + 10 & & + 10 \\ 2y & = -6x + 10 \\ \frac{2y}{2} & = \frac{-6x + 10}{2} \end{aligned}$$

c.  $5x - 2y - 18 = 0$

$$\begin{aligned} & & - 2y \\ 5x - 18 & = 2y \\ \downarrow - 2y & & - 2y \\ 5x - 18 & = 2y \\ \frac{2y}{2} & = \frac{5x - 18}{2} \end{aligned}$$

slope:  $-\frac{3}{1}$   $y$ -int:  $+5$



$$5x - 2y - 18 = 0 \quad \begin{matrix} +2y \\ +2y \end{matrix} \Rightarrow 2y = 5x - 18 \Rightarrow y = \frac{5}{2}x - 9$$

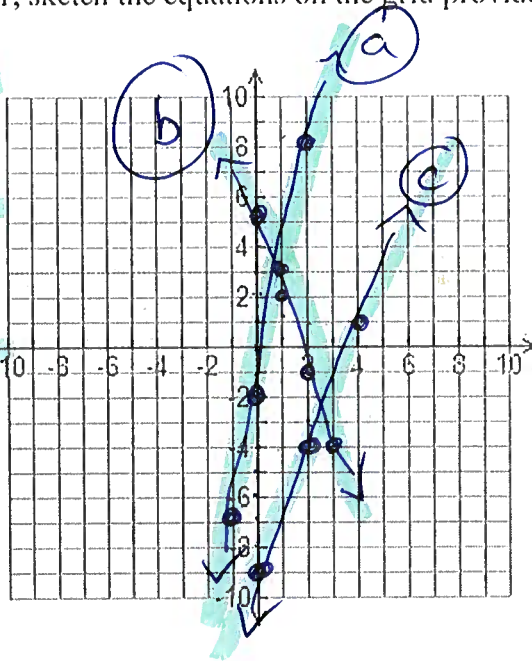
slope  
y-int

Now that we know the y- intercept and the slope, we can sketch the graphs without graphing. For Ex 1, sketch the equations on the grid provided below. Label each line.

a)  $y = 5x - 2$

b)  $y = -3x + 5$

c)  $y = \frac{5}{2}x - 9$



a)  $m = \frac{5}{1}$  rise / run  $y_{int} = -2$

b)  $m = \frac{-3}{1}$   $y_{int} = +5$

c)  $m = \frac{5}{2}$   $y_{int} = -9$

Now, we need to talk about two special cases of lines:

⇒ If there is no x term

$y = 3$  y-int

In this case, y is always 3

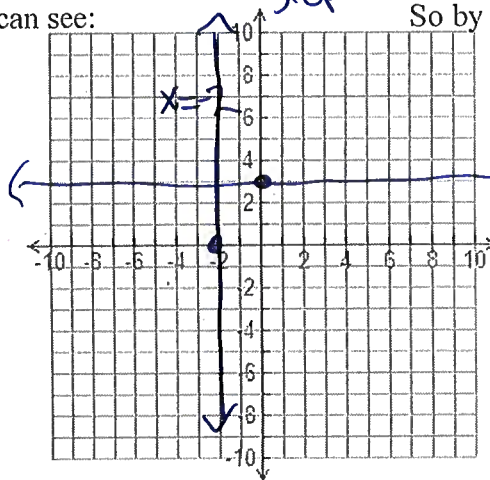
So, by graphing we can see:

⇒ If there is no y term

$x = -2$

In this case, x is always -2

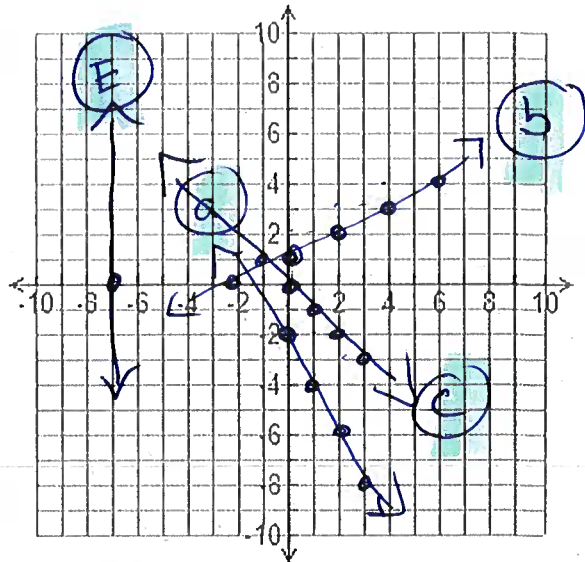
So by graphing we can see:



$y = 3$  zero slope

Ex 2: Graph the following lines on the grid:

Line
A. $y = -2x - 2$
C. $2x - 4y + 4 = 0$
D. $5x + 5y = 0$
E. $x = -7$



a)  $y = -2x - 2$

slope ↙  
 ↖ y-int

Slope =  $-\frac{2}{1}$

y-int =  $-2$

c)  $2x - 4y + 4 = 0$

$+4y$                        $+4y$

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

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

↘ slope                      ↖ y-int

d)  $5x + 5y = 0$

$-5x$                        $-5x$

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

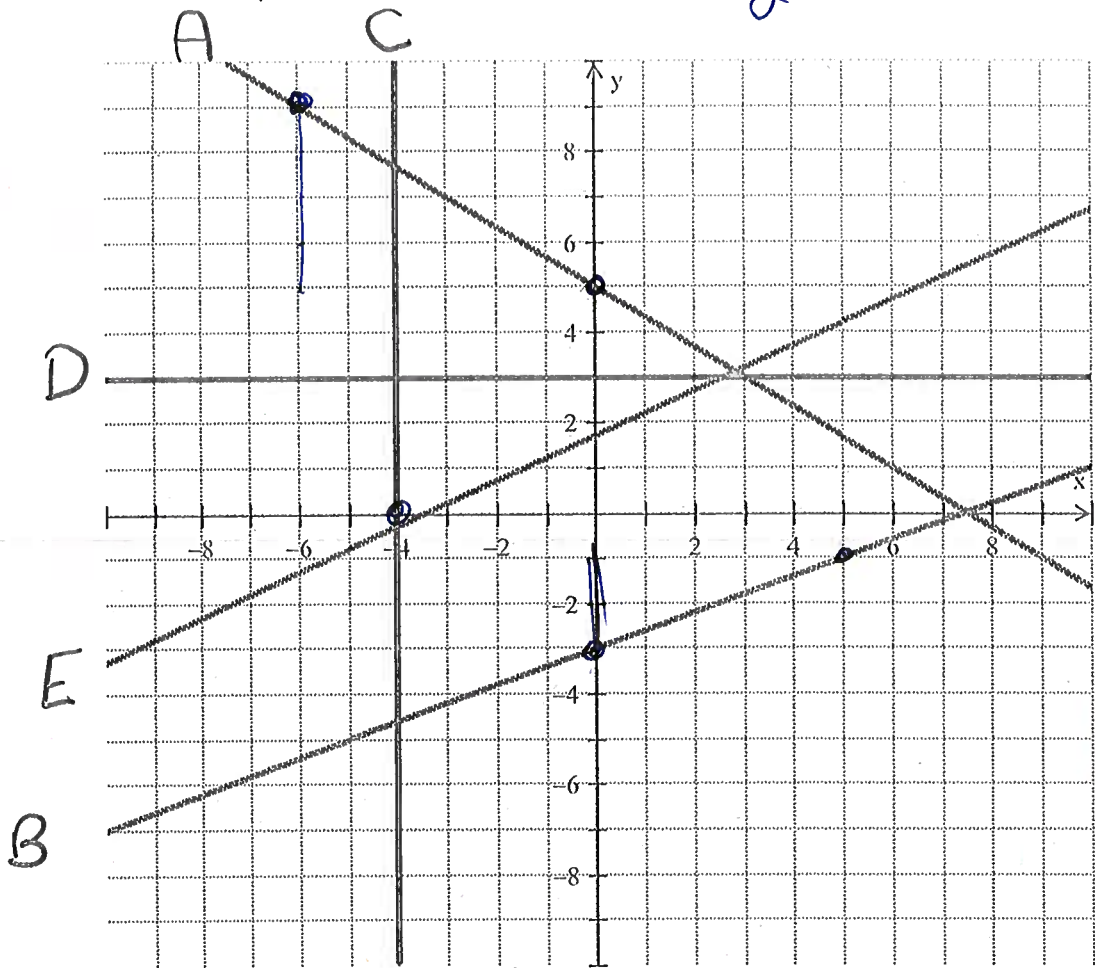
$y = -\frac{1}{1}x + 0$

e)  $x = -7$

↘ undefined

$y = mx + b$   
 slope  $m$       y-int  $b$

Give the equation for the following lines:



a)  $y\text{-int} = +5$   
 $m = -\frac{4}{6}$

$m = -\frac{2}{3}$   
 $y = -\frac{2}{3}x + 5$

b)  $y\text{-int} = -3$   
 slope =  $+\frac{2}{5}$

$y = \frac{2}{5}x - 3$

c)  $x = -4$

d)  $y = 3$

**Assignment:**

1. The equations of six lines are given below.

- i)  $y = 3x + 4$     ii)  $y = 2x - 1$     iii)  $y = -x + 5$     iv)  $y = -3x + 4$     v)  $y = x - 3$     vi)  $y = -x - 4$

a) Which equations represent lines with the same slope? What is that slope?

b) Which equations represent lines with the same y-intercept? What is that y-intercept?

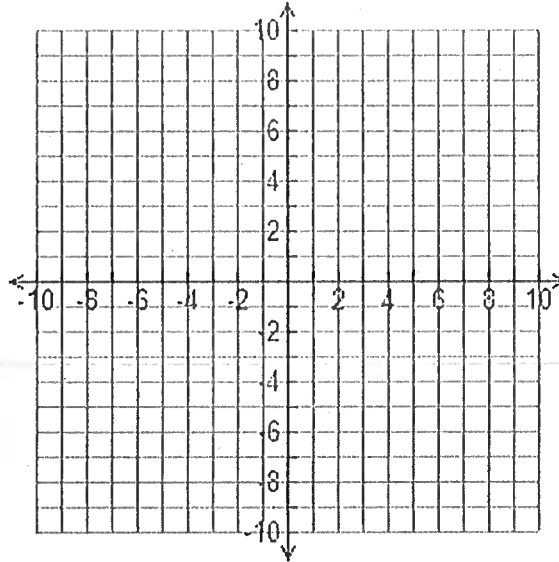
2. Determine the slope and y-intercept of each line *without graphing* then sketch the line.

a)  $y = -4x - 5$

b)  $y = \frac{2}{3}x + 4$

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

$m = \underline{\hspace{1cm}}$   $y\text{-int} = \underline{\hspace{1cm}}$      $m = \underline{\hspace{1cm}}$   $y\text{-int} = \underline{\hspace{1cm}}$      $m = \underline{\hspace{1cm}}$   $y\text{-int} = \underline{\hspace{1cm}}$



3. For the line  $y = 2x + 1$

a) What is the slope?

b) Find the  $x$ - and  $y$ - intercepts

c) Use the  $x$ - and  $y$ - intercepts you found in part b to calculate the slope of the line.

4. For the equation  $2y - 4x = 10$

a) Express the equation in slope  $y$ -intercept form.

b) What is the  $y$ -intercept?

c) Substitute  $x = 0$  into  $2y - 4x = 10$  and solve for  $y$ .

5. Express each equation in slope y-intercept form. State the slope and y-intercept of each line.

a)  $y - 3x = 15$

b)  $2x - y - 10 = 0$

c)  $3x + 4y + 12 = 0$

d)  $2x = 5y$

e)  $5x - 3y = -15$

f)  $x + 3y = 0$

g)  $6x + 5y = 2$

8.

Match each term with its appropriate value to the right. Each value may be used once, more than once, or not at all. Record your answer in the box provided to the right of the term:	
Term	Value
<p>Given the function <math>f(x) = -2x + 8</math>, find the following characteristics:</p> <p>y - intercept <input type="text"/></p> <p>x - intercept <input type="text"/></p>	<p>A. (-2,0)</p> <p>B. (0,-2)</p> <p>C. (-4,0)</p> <p>D. (0,8)</p> <p>E. (8,0)</p> <p>F. (4,0)</p>

**Answer Key:**

1a) iii, vi  $m = -1$

1b) i, iv  $b = 4$

2a)  $m = -4, y\text{-int} = (0, -5)$

2b)  $m = \frac{2}{3}, y\text{-int} = (0, 4)$

2c)  $m = -\frac{1}{2}, y\text{-int} = (0, 3)$

3a) 2

3b) (-0.5, 0) (0, 1)

3c) 2

3d) they are the same. This shows that the slope of a line is the same as the  $m$  value

4a)  $y = 2x + 5$

4b) (0, 5)

4c)  $y = 5$

4d) they are the same. This shows that the y-intercept of the line is the same as the  $b$  value.

5a)  $y = 3x + 15, m = 3, y\text{-int} = (0, 15)$

5b)  $y = 2x - 10, m = 2, y\text{-int} = (0, -10)$

5c)  $y = -\frac{3}{4}x - 3, m = -\frac{3}{4}, y\text{-int} = (0, -3)$

5d)  $y = \frac{2}{5}x, m = \frac{2}{5}, y\text{-int} = (0, 0)$

5c)  $y = \frac{5}{3}x + 5$ ,  $m = \frac{5}{3}$ ,  $y\text{-int} = (0, 5)$

5f)  $y = -\frac{1}{3}x$ ,  $m = -\frac{1}{3}$ ,  $y\text{-int} = (0, 0)$

5g)  $y = -\frac{6}{5}x + \frac{2}{5}$ ,  $m = -\frac{6}{5}$ ,  $y\text{-int} = (0, \frac{2}{5})$

- 6b) *i)* none, (0,5), all numbers,  $y = 5$ , yes  
*ii)* (0,0), (0,0), all numbers, all numbers, yes  
*iii)* (5,0), none,  $x = 5$ , all numbers, no  
*iv)* (-5,0), (0,5), all numbers, all numbers, yes

7) W

8) D, F

$$5x - 2y - 18 = 0$$

$$\frac{2y}{2} = \frac{5x}{2} - \frac{18}{2}$$

$$y = \frac{5}{2}x - 9$$

$$\text{slope} = \frac{5^{\text{rise}}}{2^{\text{run}}} \quad y_{\text{int}} = -9$$