

Name: KEY Hour: _____ Date: _____

NOTES: Section 4.5 – The Slope of a Line

Goals: #1 – I can describe what slope means.

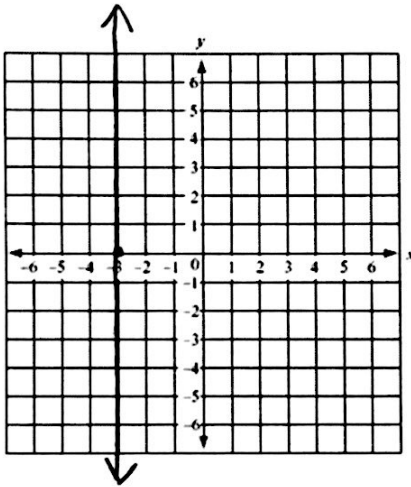


#2 – I can find the slope of a line.

Homework: Section 4.5 Worksheet

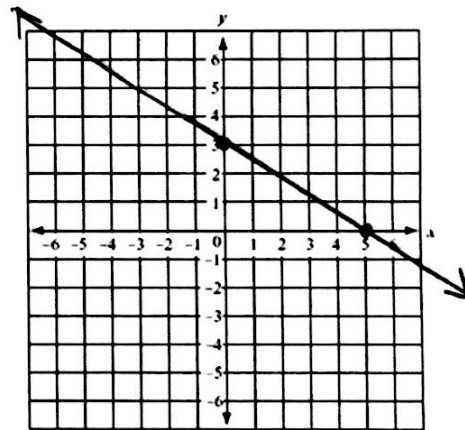
Warm Up:

1. Graph the equation $x = -3$.



2. Find the x - and y -intercepts and graph
 x -int: ($y=0$) $-3x - 5y = -15$ y -int: ($x=0$)
 $-3x = -15$ $-5y = -15$
 $x = 5$ $y = 3$

x -intercept: (5, 0)
 y -intercept: (0, 3)



Exploration #1: Work with a partner.

1. Plot the following points:

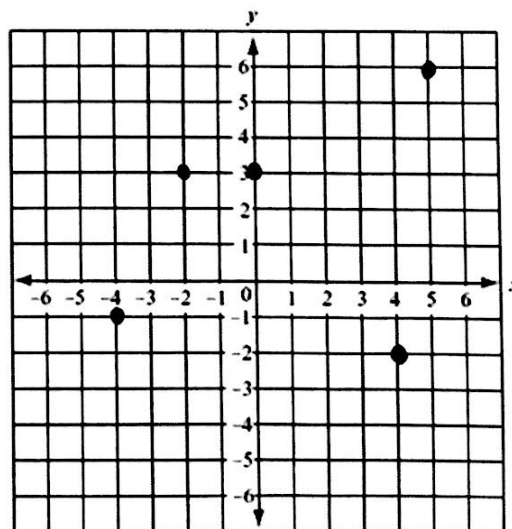
Point A: (-2, 3)

Point B: (5, 6)

Point C: (-4, -1)

Point D: (4, -2)

Point E: (0, 3)



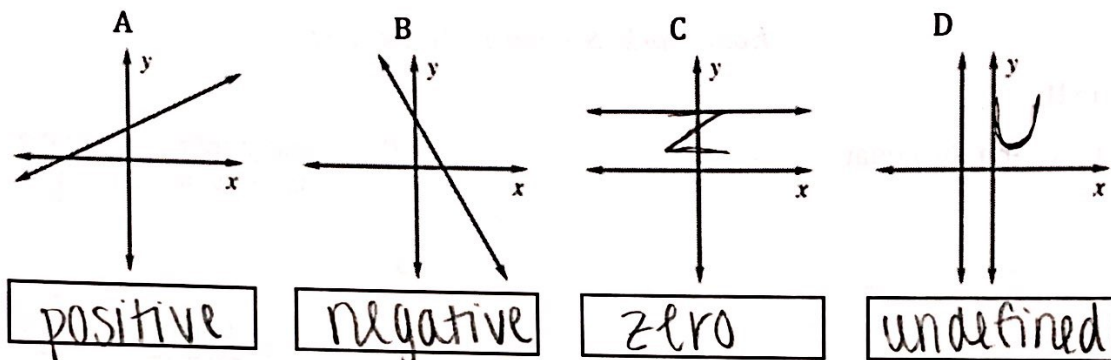
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Notes:

Between any 2 points on a coordinate grid, there is exactly one line that can be drawn.

Slope is a number we use to describe direction and steepness of a line.

• **Direction:**

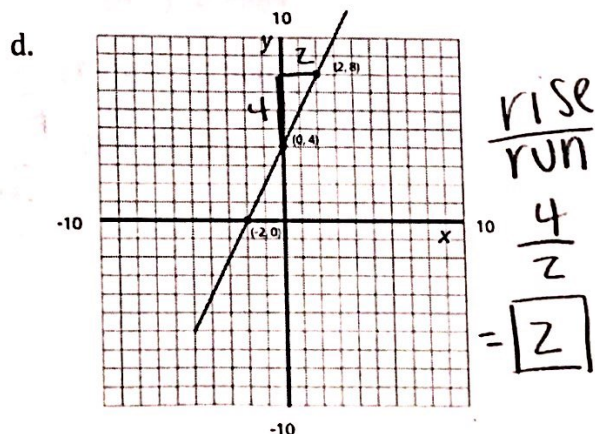
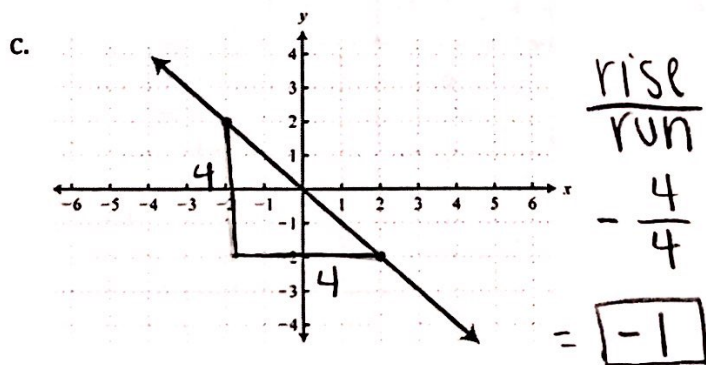
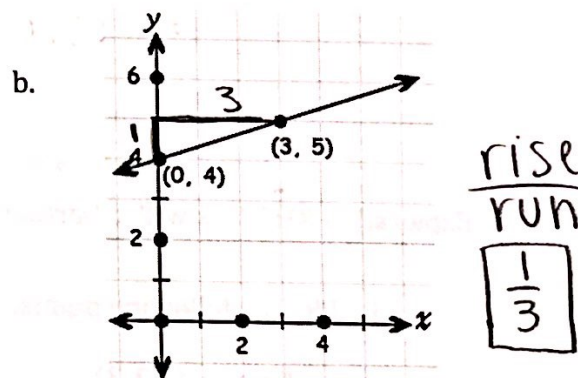
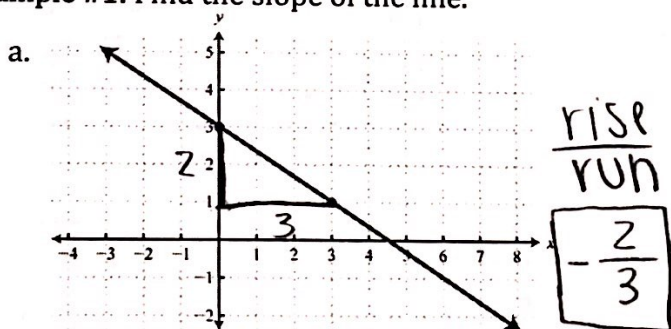


• **Steepness:**

A ratio of a line's vertical rise and horizontal run.

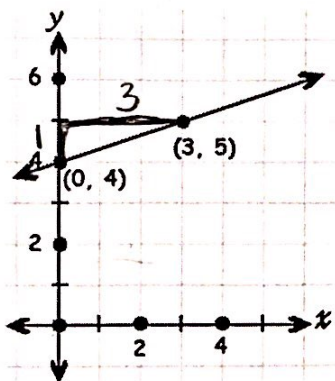
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

Example #1: Find the slope of the line.



Exploration #2: Work with a partner and follow each step.

a. Find the slope of the line below.



$$\frac{1}{3}$$

b. What is the *difference* of the labeled x-coordinates?

$$3 - 0 = \boxed{3}$$

c. What is the *difference* of the labeled y-coordinates?

$$5 - 4 = \boxed{1}$$

d. How could this relate to the *slope* of this line?

1 → rise (change in y)
3 → run (change in x)

e. Can you model this in formula?

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

Notes:

When given two ordered pairs, we can use a formula to find the slope of the line.

(x_1, y_1) (x_2, y_2)

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Example #2: Find the slope of the line that passes through the following points.

a. $(0, 3)$ and $(6, 1)$
 $x_1, y_1 \quad x_2, y_2$

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

$$\frac{1 - 3}{6 - 0}$$

$$= \frac{-2}{6}$$

$$= \boxed{-\frac{1}{3}}$$

b. $(-2, 1)$ and $(1, -3)$
 $x_1, y_1 \quad x_2, y_2$

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

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

$$= \boxed{\frac{-4}{3}}$$

c. $(1, 0)$ and $(3, 4)$
 $x_1, y_1 \quad x_2, y_2$

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

$$\frac{4 - 0}{3 - 1}$$

$$= \frac{4}{2}$$

$$= \boxed{2}$$

d. $(5, -1)$ and $(5, 3)$
 $x_1, y_1 \quad x_2, y_2$

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

$$\frac{3 - (-1)}{5 - 5}$$

$$\frac{4}{0}$$

$$= \boxed{\text{undefined}}$$

e. $(1, 2)$ and $(5, 2)$
 $x_1, y_1 \quad x_2, y_2$

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

$$\frac{2 - 2}{5 - 1}$$

$$= \frac{0}{4}$$

$$= \boxed{0}$$

f. $(2, 7)$ and $(1, 3)$
 $x_1, y_1 \quad x_2, y_2$

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

$$\frac{3 - 7}{1 - 2}$$

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

$$= \boxed{4}$$