

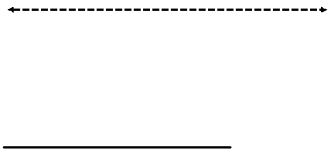
6.1 Linear Relations

Lesson 1

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Connect NOTES:

LINE - never ends.
 - has arrows at both ends to represent that it goes on of ever.



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Connect NOTES:

SLOPE

NOTE: slope can be positive or negative

FORMULA: $SLOPE = \frac{RISE}{RUN}$

RISE - is related to the vertical axis on the Cartesian plane (graph)
 - Therefore, how far **up and down** you go.

RUN - is related to the horizontal axis on the Cartesian plane (graph)
 - Therefore, how far over you go to the **left or right**.

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Connect NOTES:

The **SLOPE** of a line segment on a coordinate grid is the measure of its **RATE OF CHANGE**.

Rate of Change = $\frac{\text{change in dependent variable}}{\text{change in independent variable}}$

Rate of Change = $\frac{\text{change in } y}{\text{change in } x} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

The change in y is the RISE
 The change in x is the RUN→ SLOPE = $\frac{RISE}{RUN}$

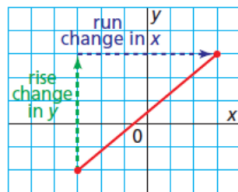
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Connect

NOTES:

The **SLOPE** of a line segment on a coordinate grid is the measure of its **RATE OF CHANGE**.

Rate of Change = $\frac{\text{change in } y}{\text{change in } x}$



$$\text{SLOPE} = \frac{\text{RISE}}{\text{RUN}} = \frac{5}{6}$$

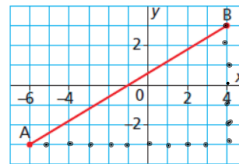
y changed by 5
x changed by 6

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Practice

EXAMPLE 1

Determine the slope of the line segment



$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{6}{10}$$

lowest terms

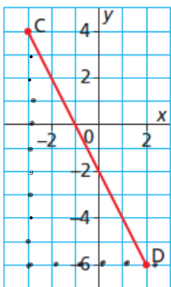
$$\boxed{m = \frac{3}{5}}$$

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Practice

EXAMPLE 1

Determine the slope of the line segment



$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{-10}{5}$$

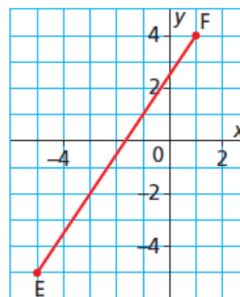
$$\boxed{m = -2}$$

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Practice

YOU TRY!

Determine the slope of the line segment



$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{8}{6}$$

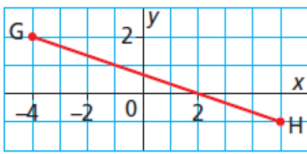
$$\boxed{m = \frac{4}{3}}$$

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Practice

YOU TRY!

Determine the slope of the line segment



$$\text{Slope} = \frac{\text{Rise}}{\text{Run}}$$

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{-3}{9}$$

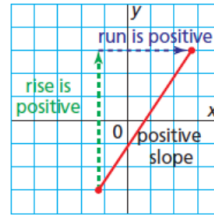
$$m = -\frac{1}{3}$$

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Connect

NOTES:

- When a line segment goes up to the right
- both y and x increase, therefore
 - both the rise and run are positive.
 - therefore the slope of the line segment is positive



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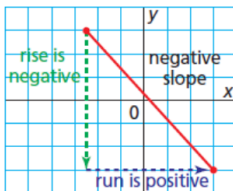
Connect

NOTES:

When a line segment goes down to the right

- y decreases - RISE is negative
- x increases - RUN is positive

-therefore the slope of the line segment is negative



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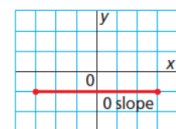
Connect

NOTES:

For a horizontal line segment

- The change in y is zero - RISE is zero
- x increases - RUN is positive

-therefore the slope is zero



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

$$\text{Slope} = \frac{0}{\text{run}}$$

$$\text{Slope} = 0$$

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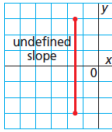
Connect **NOTES:**

For a vertical line segment

- y increases
- The change in x is zero

- RISE is positive
- RUN is zero

The slope is undefined



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

$$\text{Slope} = \frac{\text{rise}}{0}$$

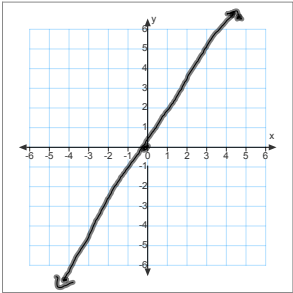
A fraction with denominator 0 is not defined.

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Practice **EXAMPLE 2**

Draw a line segment with each given slope.

a) $\frac{7}{5}$

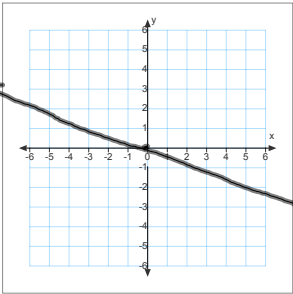


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Practice **EXAMPLE 2**

Draw a line segment with each given slope.

b) $-\frac{3}{8}$



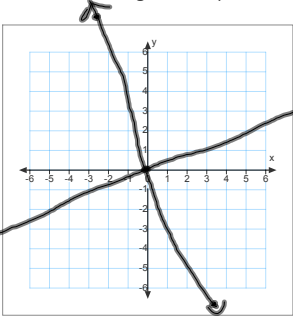
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Practice **YOU TRY!**

Draw a line segment with each given slope.

A) $\frac{4}{9}$

B) $-\frac{8}{3}$



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Practice

HOMEWORK!

Textbook Questions:

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Page 340 # 6, 7, 11

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