6.1 Slope of a Line

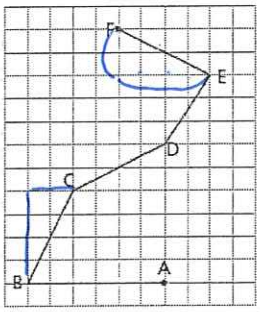
From page 332 of your textbook:

Construct Understanding

TRY THIS

Work with a partner.

This diagram shows different line segments on a square grid.



A. Think of a strategy to calculate a number to represent the steepness of each line segment.

B. Which is the steepest line segment? How does your number show that?

C. Which segment is the least steep? How does its number compare with the other numbers?

A) Look at how high ↑ over how far →.

B) BC. It goes up 4 squares and right 2 squares

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

C) EF. It goes down 2 squares and right 4. $\frac{-2}{4} = \frac{-1}{2}$ It's negative.

The slope of a line segment is the same as its rate of change, which we calculated in Chapter 5.

If the segment goes down, the rate is negative.

Foundations and Pre-Calculus 10

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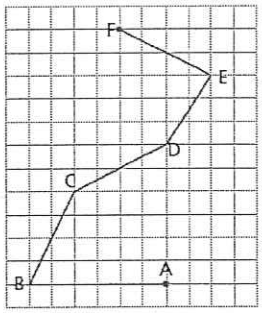

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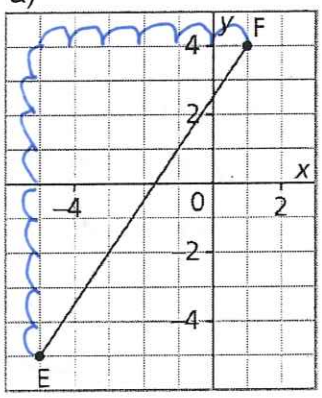
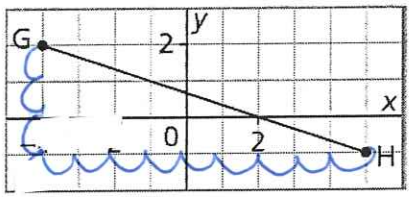
The slope of a line segment is the same as its rate of change, which we calculated in Chapter 5.

Example: Determine the slope of each line segment.

a)



b)



Slope $= \frac{-3}{9} = -\frac{1}{3}$

Slope $= \frac{9}{6} = \frac{3}{2}$

Note: Choose the left most point and count vertically first. Up is + and Down is −.

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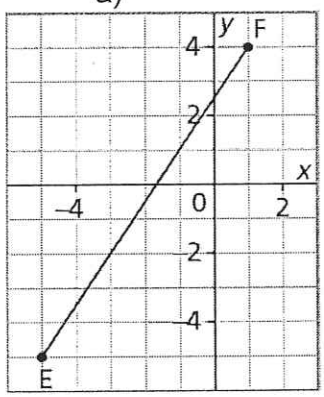
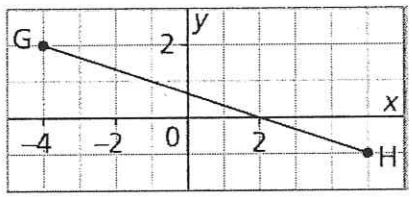


b)

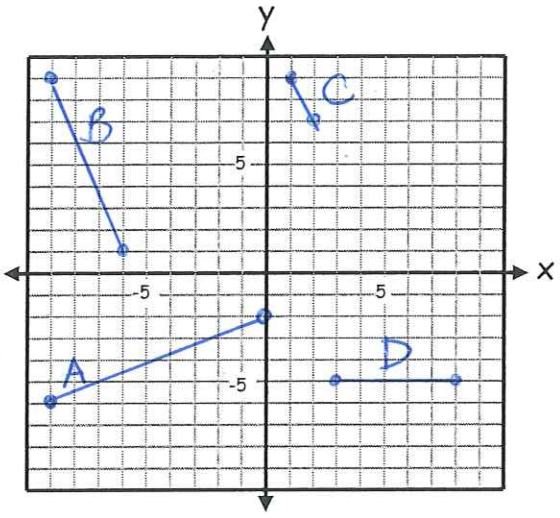


Example: Draw a line segment with each slope.

a) $\frac{4}{9}$ b) $-\frac{8}{3}$ c) -2 d) 0

$= \frac{-2}{1}$ $= \frac{0}{5}$

I just chose 5



Example: Determine the slope of a line that passes through each pair of points.

You can plot these or use the equation.

a) A(4,-5) and B(8,6)

(x_1, y_1) (x_2, y_2)

$\text{slope} = \frac{6-(-5)}{8-4}$

$= \frac{11}{4}$

b) X(3,6) and Y(3,10)

(x_1, y_1) (x_2, y_2)

$\text{slope} = \frac{10-6}{3-3}$

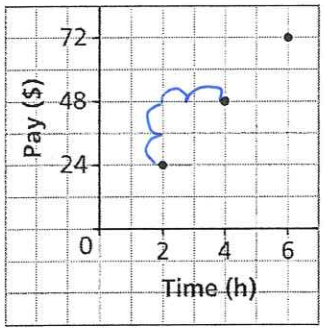
$= \frac{4}{0}$ ← we cannot divide by zero. (this gives a vertical line)

= undefined

$\text{Rate of change} = \frac{\text{vertical change}}{\text{horizontal change}} \longrightarrow \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

Example: Tom has a part-time job. He recorded the hours he worked and his pay for 3 different days. Tom plotted these data on a grid.

Graph of Tom's Pay



a) What is the slope of the line through these points? $\text{slope} = \frac{24}{2} = 12$

b) What does the slope represent?

rate of change = 12 = \$12/h Tom makes \$12 per hour

c) How can the answer to part b be used to determine:

i) how much Tom earned in 3 ½ hours? $12 \times 3.5 = \$42$

ii) the time it took Tom to earn \$30?

$\$30 \div 12 = 2.5$ hours