

Chapter 6: Linear Functions

http://www.youtube.com/watch?v=tMhF-1ew_bM&feature=related



1



2

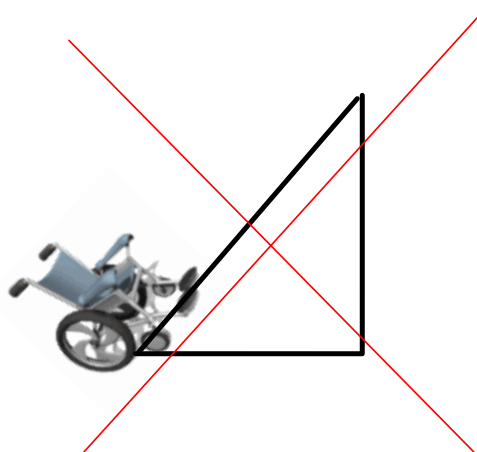
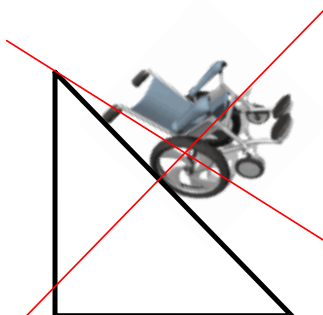


3



7

A wheelchair ramp
should not exceed
a slope of
0.125.

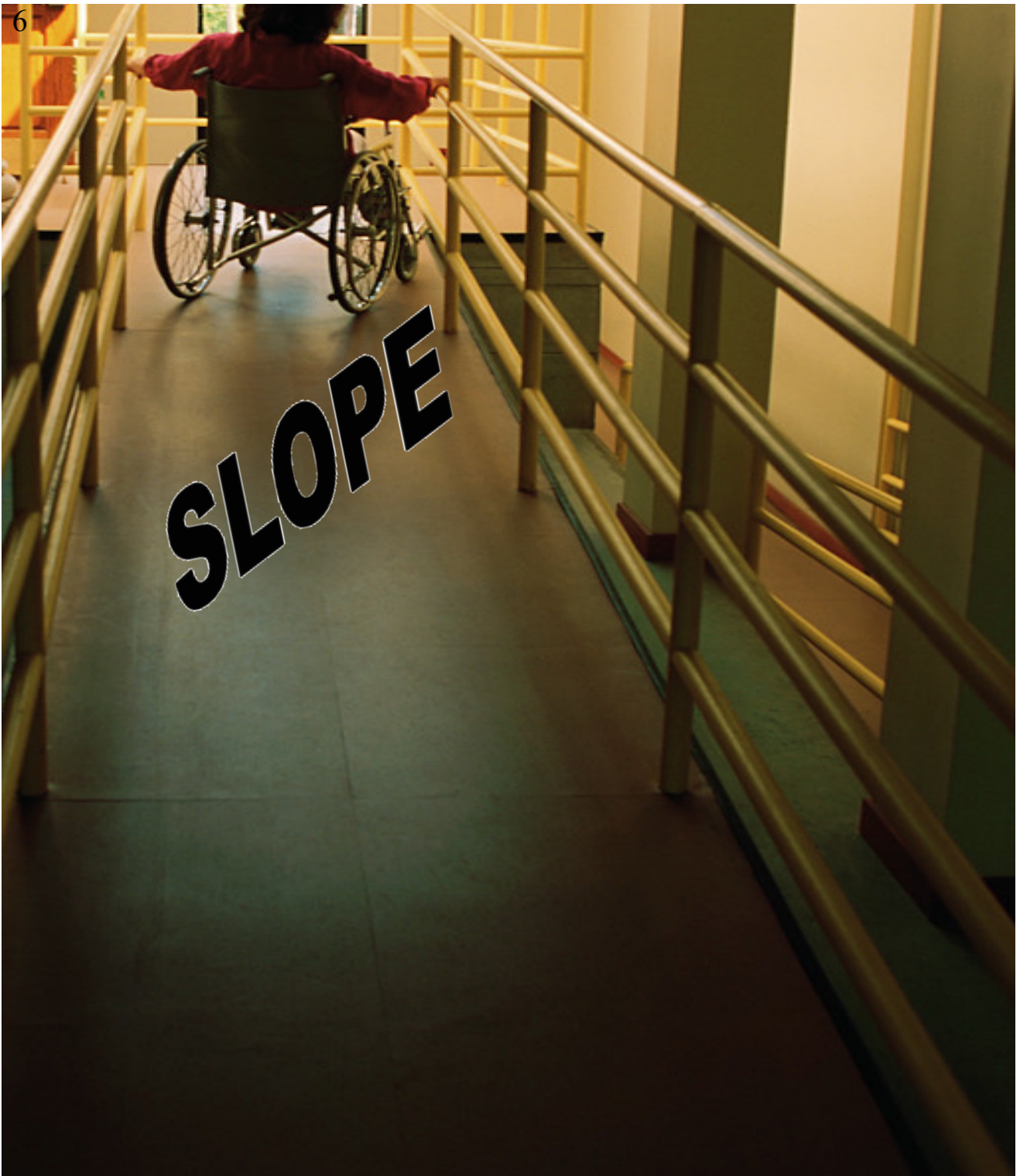


8



Building stairs
should
not exceed
a slope of
0.83

6



10

Calculating slope!

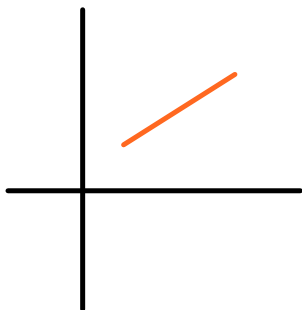
When you see a graph **Same as rate of change**



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

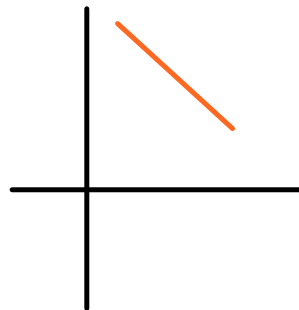
$$\frac{\Delta y}{\Delta x}$$

Positive slopes



when read left to right,
it looks like going up hill

negative slopes



when read left to right,
it looks like going down hill

Some roofs are steeper than others. Steeper roofs are more expensive to shingle.
 The steepness of a roof is measured by calculating its **slope**.

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

The **rise** is the vertical distance from the bottom of the edge of the roof to the top.
 The **run** is the corresponding horizontal distance.
 For each roof, we count units to determine the rise and the run.

Roof A



For Roof A

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

$$\text{Slope} = ?$$

Slope-intercept equation

$$y = mx + b$$

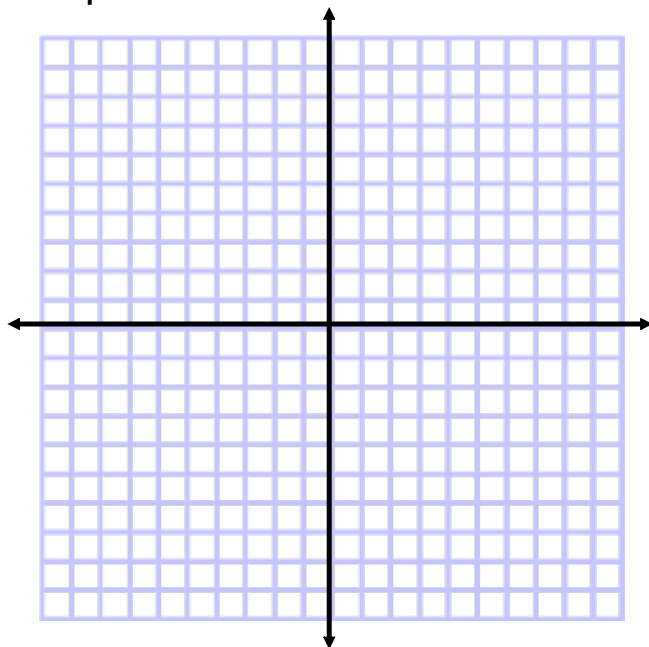
↑ ↓
slope y-intercept

Ex) $y = -3x + 4$

$m =$

y-intercept =

Sketch using these
two pieces of
information



The slope of a line segment on a coordinate grid is the measure of its rate of change.
From Chapter 5, recall that:

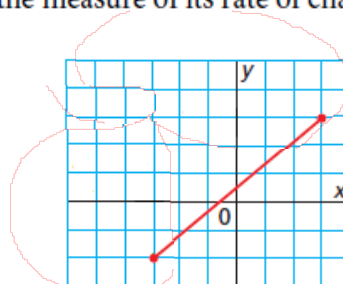
$$\text{Rate of change} = \frac{\text{change in dependent variable}}{\text{change in independent variable}}$$

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

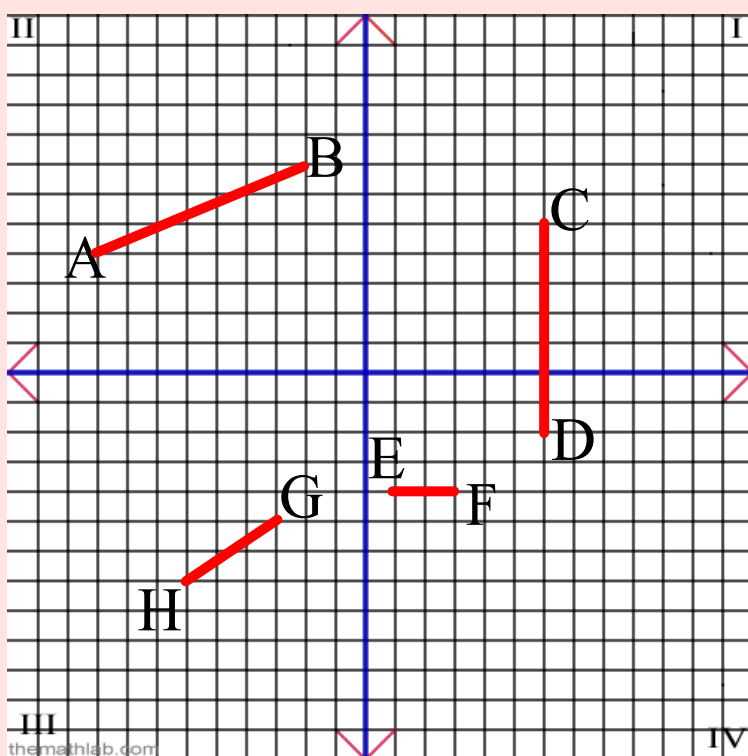
The change in y is ?

The change in x is ?

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



11



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



This is used
when you
can see the
graph!

Calculating slope!

When you are given two points

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

Find the slope of a line passing through points (2,-3) and(-5,8).

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

This is used when you are given co-ordinates.

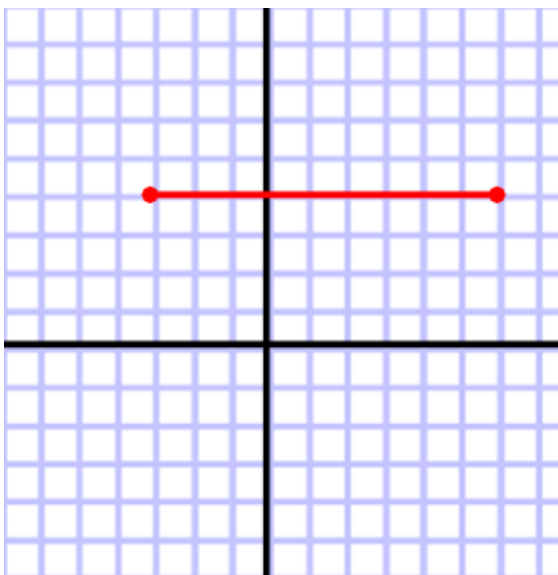
YOU TRY

Find the slope of a line passing through the points (7,5) and (8,-2).

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

Horizontal Line

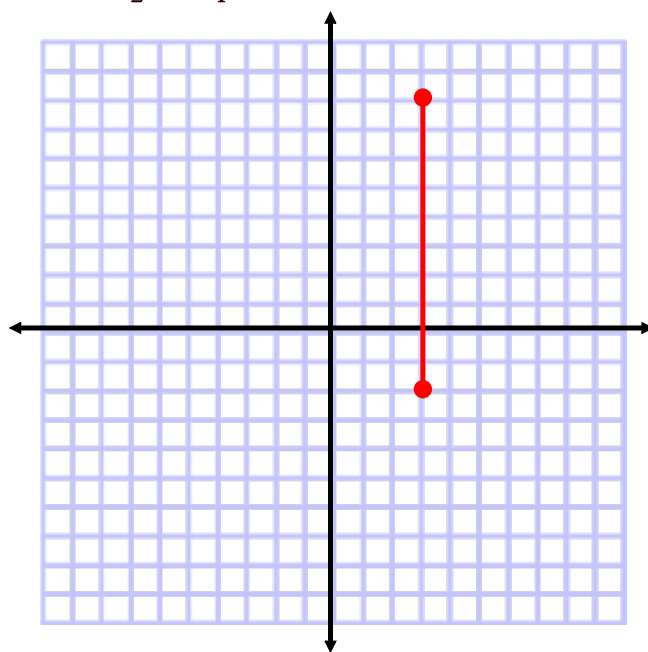
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$



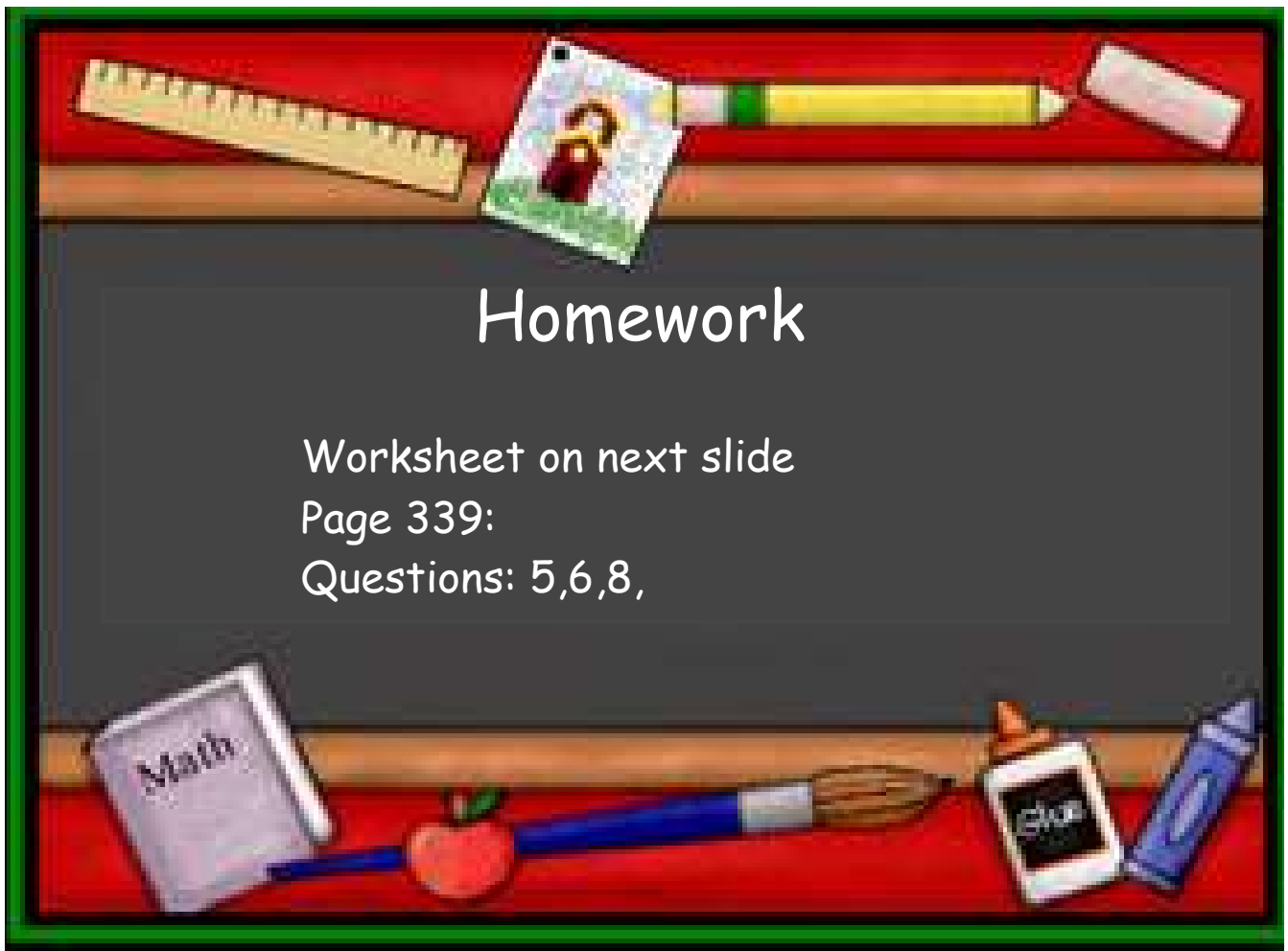
Pick two points

1
2
3
4
5
6
7
8
9
10

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



1
2
3
4
5
6
7
8
9
10



Calculate the slope.

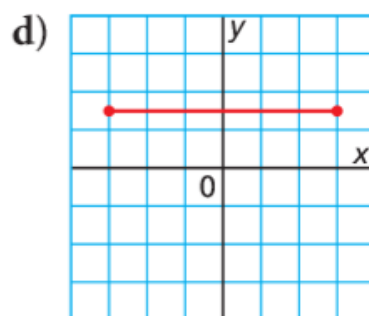
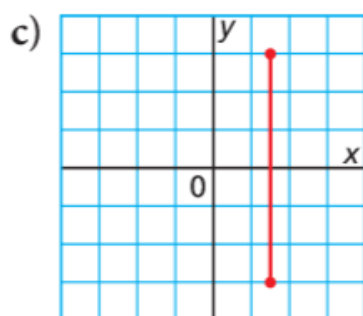
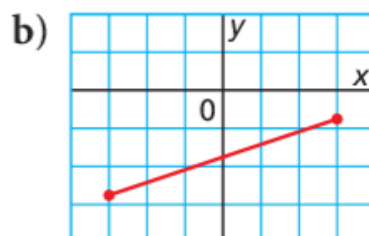
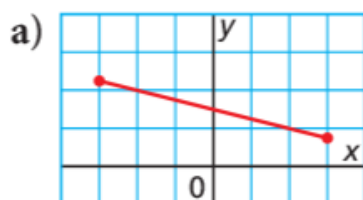
1. (3,5) (2,8)

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

2. (-9,-2) (7,3)

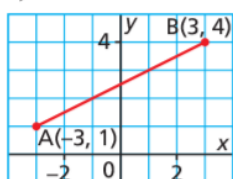
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

5. For each line segment, is its slope positive, negative, zero, or not defined?

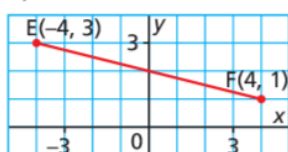


6. For each line segment, determine its rise, run, and slope.

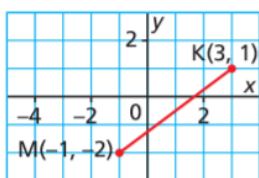
a)



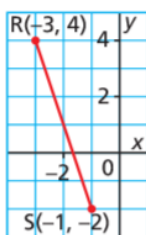
b)



c)



d)



- 8.** Sketch a line whose slope is:
- a) positive
 - b) zero
 - c) negative
 - d) not defined

Examples are in your notes

Solutions Calculate the slope.

1. (3,5) (2,8)

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

$$m = \frac{8 - 5}{2 - 3}$$

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

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

2. (-9,-2) (7,3)

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

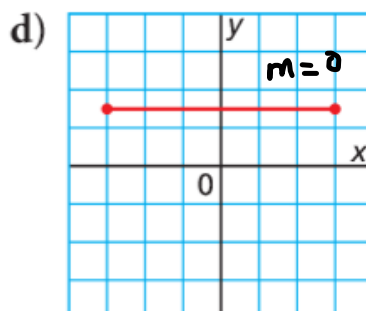
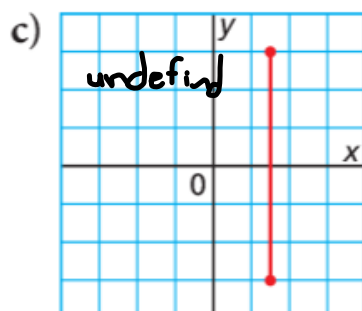
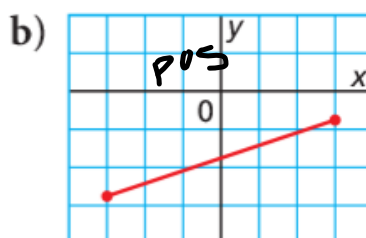
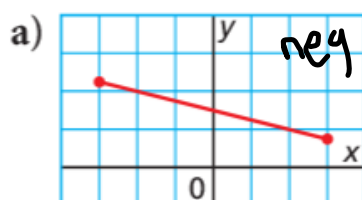
$$m = \frac{3 - (-2)}{7 - (-9)}$$

$$m = \frac{3 + 2}{7 + 9}$$

$$m = \frac{5}{16}$$

Solutions

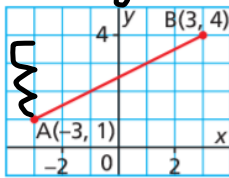
5. For each line segment, is its slope positive, negative, zero, or not defined?



Solutions

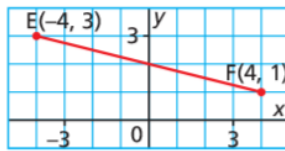
6. For each line segment, determine its rise, run, and slope.

a) $m = \frac{3}{6} = \frac{1}{2}$



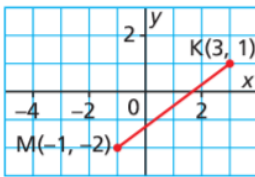
b)

$$m = \frac{-2}{8} = -\frac{1}{4}$$



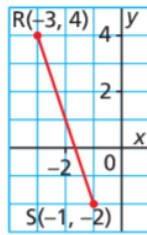
c)

$$\frac{3}{4}$$




d)


$$m = -\frac{6}{2} = -3$$



Solutions

8. Sketch a line whose slope is:

a) positive 

b) zero 

c) negative 

d) not defined 