Slope Formula

Essential Question: How can I use the slope formula to find slope from 2 points?

Agenda

Warm-up (Exploration)
HW Check
Notes (Slope Book)
Homework

Reminders

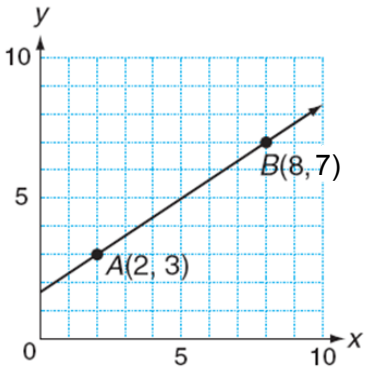
Test corrections due by 4:15PM
Bathroom passes due TMR
Slope quiz TMR

Warm-up

Complete the exploration in your slope book (under the formula tab).

Exploration: To investigate a shortcut for finding the slope of a line.

1. What is the rise from point A to point B?
2. What is the run from point A to point B?
3. What is the slope of the line?
4. Explain how you could have found the rise by using only the *y*-coordinates of the two points, without seeing the graph.
5. Explain how you could have found the run by using only the *x*-coordinates of the two points, without seeing the graph.



#3, #4, #5, 8, 9

Algebra I - Unit 3

Practice – Slope from a Table

pp 320-325

Name _____ Date _____ Period _____

Find the rate of change on the following tables.

1.

x	y
1	4
2	2
3	0
4	-2

_____

2.

x	-2	1	5	7
y	34	37	41	43

_____

3.

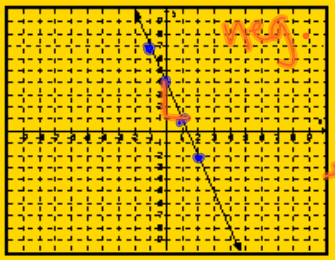
x	y
-3	6
3	-2
6	-6
12	-14

+6 +3 +6 → -4 -4 -8

$m = \frac{-8}{6} = \frac{-4}{3}$

4. Given the following graphs, make a table of values and find the rate of change.

a.

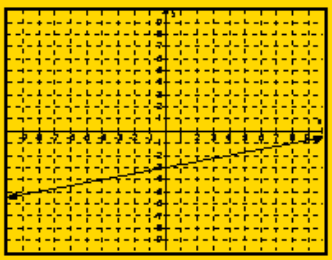


x	y
0	4
1	1
2	-2

+1 +1 → -3 -3

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

b.



x	y

5. Given the two points, (-2, -1) and (4, 2), make a table and determine the slope.

x	y
-2	-1
4	2

6. In two hours a bus travels 100 miles while in three hours a bus travels 150 miles. Fill in the table, including what the independent and dependent variables are for this situation. Find the slope and explain what it represents for this situation.

x y

_____

_____

Algebra I - Unit 3

7. Which of the following tables best represent a linear function with a rate of change of $\frac{3}{4}$?

A

x	y
-3	-4
0	0
3	4

B

x	y
1	2.50
3	4
4	4.75

C

x	y
0	1.75
6	9.75
9	13.75

D

x	y
-4	1
0	-2
4	-5

8. Determine the slope from the table.

Time (seconds)	3	21	30	42
Number of letters texted	2	14	20	28

+9 +9 +12
+12 +6 +8

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

9. Create a table with a rate of change of $\frac{1}{2}$.

x	y
0	1
2	2
4	3
6	4
8	5

+2 +2 +2 +1 +1

$m = \frac{1}{2} = \frac{\Delta y}{\Delta x}$

10. Which of the following tables has a slope of $\frac{-4}{5}$?

A B

x	y
-6	7.5
-4	5
-2	2.5
6	-7.5
10	-12.5

C

x	y
-6	-4.8
-2	-1.6
4	3.2
10	8
12	9.6

D

x	y
-3	-3.75
-1	-1.25
5	6.25
10	12.5
14	17.5

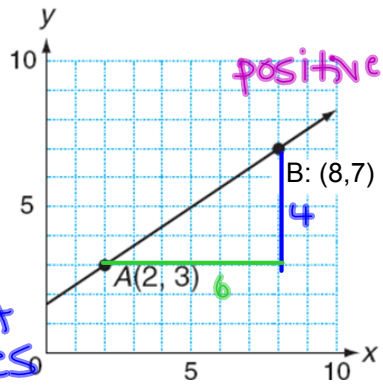
x	y
-5	4
-1	0.8
4	-3.2
11	-8.8
13	-10.4

Essential Question: How can I use the slope formula to find slope from 2 points?

Finding Slope...

Exploration: To investigate a shortcut for finding the slope of a line.

1. What is the rise from point A to point B? 4
2. What is the run from point A to point B? 6
3. What is the slope of the line?
   $m = \frac{\text{RISE}}{\text{RUN}} = \frac{4}{6} = \frac{2}{3}$
4. Explain how you could have found the rise by using only the *y*-coordinates of the two points, without seeing the graph. (2,3) (8,7) 4 subtract y-values
5. Explain how you could have found the run by using only the *x*-coordinates of the two points, without seeing the graph. 2 & 8 → 6 subtract x-values



Given two points (x_1,y_1) and (x_2,y_2) find the slope (m)

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{RISE}}{\text{RUN}} = \frac{\Delta y}{\Delta x}$

Determine the slope of the line that passes through each set of points. LABEL POINTS

1. (2,3) and (9,7)
   $x_1\ y_1$ $x_2\ y_2$
   $m = \frac{7-3}{9-2} = \frac{4}{7}$

2. $\left(-3\frac{1}{2}, -4\right)$ and $\left(5\frac{1}{4}, -1\right)$
   (-3.5,-4) and (5.25,-1)
   $x_1\ y_1$ $x_2\ y_2$
   $m = \frac{-1-(-4)}{5.25-(-3.5)} = \frac{3}{8.75} = \frac{12}{35}$

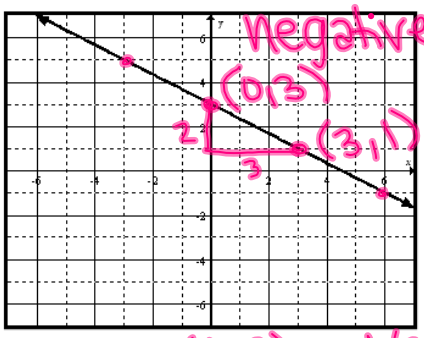
3. (-5,4) and (-5,-1)
   $x_1\ y_1$ $x_2\ y_2$
   $m = \frac{-1-4}{-5-(-5)} = \frac{-5}{0}$ undefined

4. (10,8) , (-6,-2) and (-14,-7)
   $x_1\ y_1$ $x_2\ y_2$ PICK 2
   $m = \frac{-2-8}{-6-10} = \frac{-10}{-16} = \frac{5}{8}$

5. (-2,3) and (8,3)
   $x_1\ y_1$ $x_2\ y_2$
   $m = \frac{3-3}{8-(-2)} = \frac{0}{10} = 0$

Determine the slope of the line that passes through each set of points.

6.



negative

(0,3) (3,1)

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

(0,3) and (3,1)

$x_1\ y_1$ $x_2\ y_2$

$m = \frac{1-3}{3-0} = \frac{-2}{3}$

7.

x	0	2	5	6
y	1	5	11	13

+2 +3 +2

+4 +6 +2

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

(0,1) and (2,5)

$x_1\ y_1$ $x_2\ y_2$

$m = \frac{5-1}{2-0} = \frac{4}{2} = 2$

8. The graph shows how much water is in a reservoir at different times. Find the slope of the line and explain what the slope represents

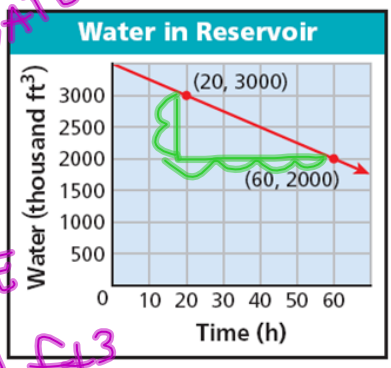
(20, 3000) and (60, 2000)

$x_1\ y_1$ $x_2\ y_2$

$m = \frac{2000-3000}{60-20} = \frac{-1000}{40} = \frac{-25}{1}$

WATER

TIME



Every hour, water decreases by 25 thousand ft³.

Determine the value of r so the line that passes through each pair of points has the given slope. point-slope: $y_2 - y_1 = m(x_2 - x_1)$

9. (9,r) and (6,3) $m = -\frac{1}{3}$

$x_1\ y_1$ $x_2\ y_2$

$3 - r = -\frac{1}{3}(6-9)$

$3 - r = -\frac{1}{3}(-3)$

$3 - r = 1$

$-3 \quad -3$

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

$r = 2$

10. (3,4) and (8,r) $m = -\frac{3}{4}$

Bonus points: tweet/email correct answer by 5:30.

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

$m(x_2 - x_1) = y_2 - y_1$

$y_2 - y_1 = m(x_2 - x_1)$

Algebra I - Unit 3

Practice – Slope Formula pp 320-322

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Label each ordered pair. Determine the slope of the line that passes through each set of points.

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

2. (-5, 8) and (-5, 2)

3. (9, 2), (3, -1) and (-5, -5)

4. $(1\frac{1}{2}, -1)$ and $(-2\frac{1}{5}, -6)$

5. (-3.4, -3.2) and (0, 0)

6. (5, -2) and (8, -2)

Determine the value of *r* so the line that passes through each pair of points has the given slope.

7. (5, *r*) and (2, -3) $m = \frac{4}{3}$

8. (4, -5) and (*r*, -13) $m = 8$

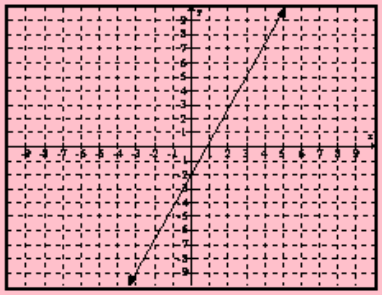
Algebra I - Unit 3

Each graph or table shows a linear relationship. Find the slope

9.

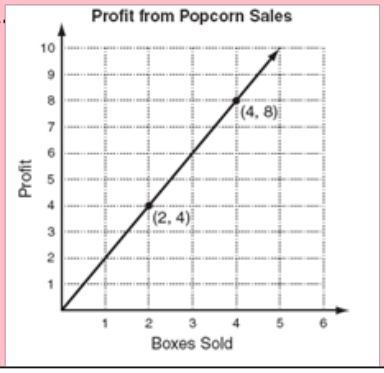
x	y
0	82
3	76
6	70
9	64
12	58

10.



Identify the independent and dependent variables, then find the slope of each line and tell what it represents.

11.



Independent variable: _____

Dependent variable: _____

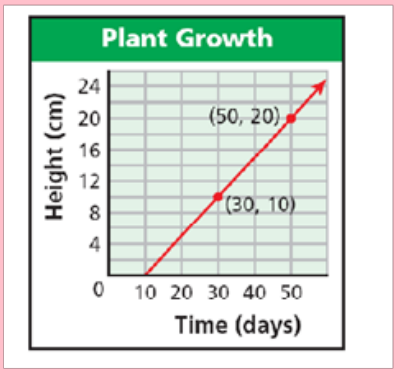
Slope:

_____

_____

_____

12.



Independent variable: _____

Dependent variable: _____

Slope:

_____

_____

_____

13. During the last four years, Jimmy visited 26% of the 50 states in the US. How many states did he visit?

Homework Check:
Slope Formula

Answers:

1. $-\frac{1}{3}$
2. Undefined
3. $\frac{1}{2}$
4. $\frac{50}{37}$
5. $\frac{16}{17}$
6. 0
7. $r = 1$
8. $r = 3$
9. -2
10. $\frac{7}{3}$

11. Independent: boxes sold
Dependent: profit
m = \$2
Slope represents a profit of \$2 that was made for every box sold

12. Independent: time (days)
Dependent: height (cm)
$m = \frac{1}{2}cm$
A plant grows 1 cm every 2 day

Quiz Tomorrow!