Slope Formula

Agenda

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

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.

B. (8,7)
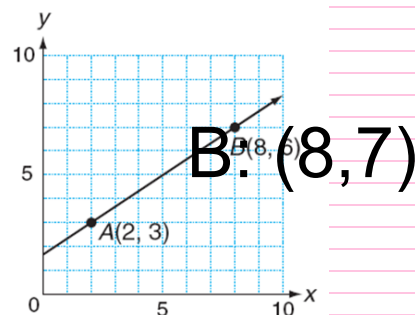
Answers:

1. $m = -2$
2. $m = 1$
3. $m = \dfrac{-4}{3}$
4. a. $m = -3$ possible table

x	y
0	4
1	1
2	-2

   b. $m = \dfrac{1}{4}$ possible table

x	y
0	-3
4	-2
8	-1

5. $m = \dfrac{1}{2}$
6.

x hours	y miles
2	100
3	150

Independent Variable: number of hours
Dependent Variable: number of miles

Slope = $\dfrac{50}{1}$ = 50 miles per hour

7. B
8. $m = \dfrac{2}{3}$
9. Answers will vary; possible answer

x	y
0	2
1	4
2	6
3	8
4	10

10. D

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? $\dfrac{4}{6} = \dfrac{2}{3}$

4. Explain how you could have found the rise by using only the *y*-coordinates of the two points, without seeing the graph.   **4**   **3**   **7**
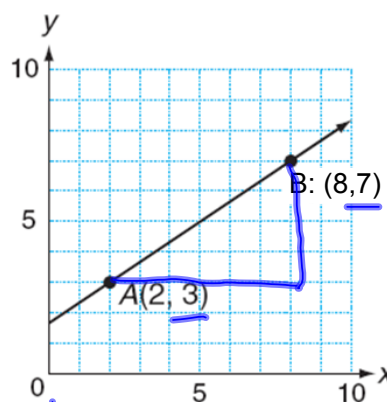
   subtract y coordinates

5. Explain how you could have found the run by using only the *x*-coordinates of the two points, without seeing the graph.   **6**   **2**   **8**

   subtract x coordinate

Graph: line passing through A(2, 3) and B: (8,7)

GIVEN TWO POINTS (x_1, y_1) and (x_2, y_2) FIND THE SLOPE (m)

Slope Formula: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

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

LABEL YOUR POINTS

1. (2,3) and (9,7)

   $\underset{x_1\ y_1}{}\quad \underset{x_2\ y_2}{}$

   $m = \dfrac{7-3}{9-2} = \boxed{\dfrac{4}{7}}$

2. $\left(-3\tfrac{1}{2}, -4\right)$ and $\left(5\tfrac{1}{4}, -1\right)$

   $(-3.5, -4) \quad (5.25, -1)$

   $\underset{x_1\ \ y_1}{}\qquad \underset{x_2\ \ y_2}{}$

   $m = \dfrac{-1+4}{5.25 + 3.5} = \dfrac{3}{8.75} = \boxed{\dfrac{12}{35}}$

3. (-5,4) and (-5, 1)²

   $m = \dfrac{-1-4}{-5+5} = \dfrac{-5}{0}$ $\boxed{\text{undefined}}$

4. (10,8) , (-6,-2) and (-14,-7)

   PICK 2

   $-16\left(\begin{array}{c|c} x & y \\ \hline 10 & 8 \\ -6 & -2 \\ -14 & -7 \end{array}\right)$ to $m = \dfrac{+10}{+16}$

   $\boxed{m = \dfrac{5}{8}}$

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

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

6.
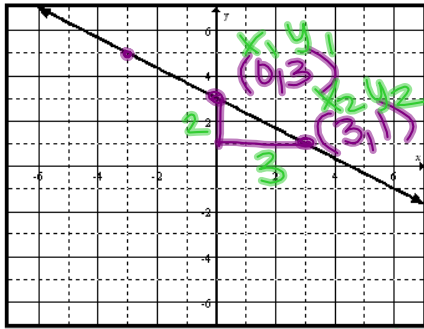
$(0,3)$ x_1, y_1
$(3,1)$ x_2, y_2

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

7.

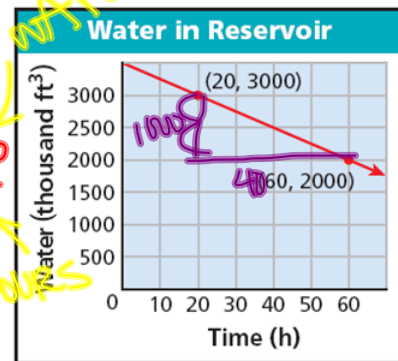| x	0	2	5	6
y	1	5	11	13

$(5,11)$ and $(6,13)$
$x_1 \; y_1$ $x_2 \; y_2$

$$m = \frac{13-11}{6-5} = \frac{2}{1}$$

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 $(60, 2000)$
$\quad x_1 \quad\quad y_1 \quad\quad\quad x_2 \quad y_2$

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

Reservoir loses 25 thousand ft³ of water every hour.

Water in Reservoir
(20, 3000)
(60, 2000)
Water (thousand ft³)
Time (h)

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

9. $(9,r)$ and $(6,3)$ $m = -\frac{1}{3}$
$\quad x_1 \, y_1 \quad x \; y$

$$3 - r = -\frac{1}{3}(6-9)$$
$$3 - r = -\frac{1}{3}(-3)$$
$$3 - r = 1$$
$$-3 \quad\quad -3$$
$$\frac{-r}{-1} = \frac{-2}{-1}$$
$$\boxed{r = 2}$$

10. $(3,4)$ and $(8,r)$ $m = -\frac{3}{4}$
$\quad x_1 \, y_1 \quad x \; y$

$$r - 4 = -\frac{3}{4}(8-3)$$
$$r - 4 = -\frac{3}{4}(5)$$
$$r - 4 = -\frac{15}{4}$$
$$+4 \quad\quad +4$$
$$\boxed{r = .25}$$

ODDS

Exit Ticket
11: 45

Algebra I - Unit 3

Practice – Slope Formula

Name _____ Date _____ Period _____

pp 320-322

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) $m = \frac{4}{3}$
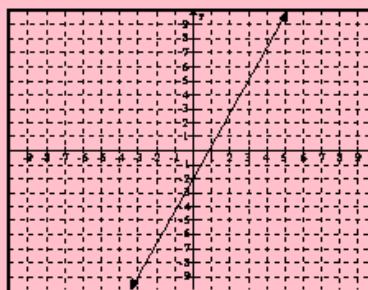
8. (4, -5) and (r, -13) $m = 8$

Algebra I - Unit 3

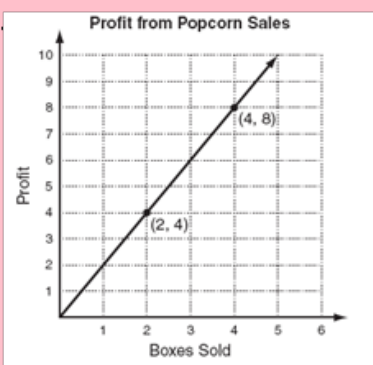**Each graph or table shows a linear relationship. Find the slope**

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.

Profit from Popcorn Sales

(4, 8)
(2, 4)

Independent variable: _____

Dependent variable: _____

Slope:

_____
_____
_____

12.

Plant Growth

(50, 20)
(30, 10)
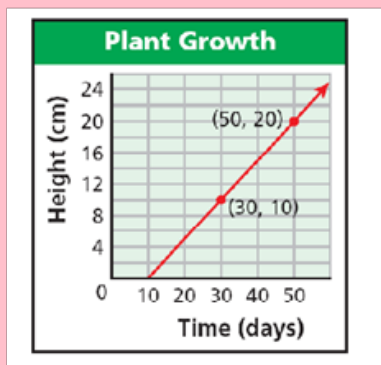
Independent variable: _____

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?

1. Mark works full time as a busboy at a local restaurant. He earns $6 per hour and then an additional $3 per hour for each hour of overtime (every hour he works over 40 hours per week). What is the independent variable in this situation?

A. Salary per hour
B. Hours of overtime
C. Hours worked
D. Total salary

2. The number of gumballs, g, that can be packaged in a box with a volume of V cubic units is given by the equation g = 40V +15. What is the dependent variable in this situation?

A. Number of gumballs
B. Volume of the box
C. 15
D. 40

3. Jake works as a sales representative. He earns $1,275 per month plus an 8% commission on his total sales. What is the independent variable in this situation?

A. Total sales
B. Commission earned
C. Money earned per month
D. Percent of commission