

**LESSON**  
**5-4** **Guided Notes**  
**The Slope Formula**

You can find the slope of a line from any two ordered pairs. The ordered pairs can be given to you, or you might need to read them from a table or graph.

**Find the slope of the line that contains (-1, 3) and (2, 0).**

**Step 1:** Name the ordered pairs. (It does not matter which is first and which is second.)



**Step 2:** Label each number in the ordered pairs.



**Step 3:** Substitute the ordered pairs into the slope formula.

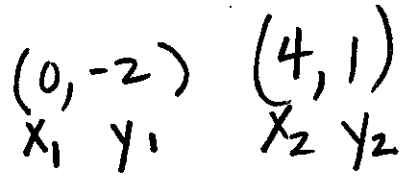
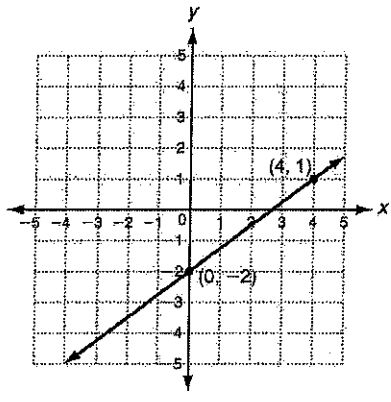
$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{0 - 3}{2 - (-1)} \\
 &= \frac{-3}{3} \\
 &= -1
 \end{aligned}$$

simplify

The slope of the line that contains (-1, 3) and (2, 0) is -1.

**Find the slope of each linear relationship.**

1.



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

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

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

2.

| x  | y  |
|----|----|
| 4  | -5 |
| 8  | -3 |
| 12 | -1 |
| 16 | 1  |

| # 1                                                | # 2                                                 | # 3                                                 |
|----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| $(4, -5)$<br>$(8, -3)$<br>$x_1, y_1$<br>$x_2, y_2$ | $(8, -3)$<br>$(12, -1)$<br>$x_1, y_1$<br>$x_2, y_2$ | $(12, -1)$<br>$(16, 1)$<br>$x_1, y_1$<br>$x_2, y_2$ |
| $m = \frac{-5 - (-3)}{4 - 8}$                      | $m = \frac{-3 - (-1)}{8 - 12}$                      | $m = \frac{-1 - 1}{12 - 16}$                        |

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

3. The line contains (5, -2) and (7, 6).

$(5, -2)$      $(7, 6)$   
 $x_1, y_1$      $x_2, y_2$

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

$m = \frac{-2 - 6}{5 - 7}$

$m = 4$

**LESSON**  
**5-4**

**Guided Notes**

**The Slope Formula** *continued*

You can also find slope from an equation using the x- and y-intercepts.

Find the slope of the line described by  $x - 3y = -9$ .

**Step 1:** To find the x-intercept, substitute 0 for y.

**Step 2:** To find the y-intercept, substitute 0 for x.

$$\begin{aligned} x - 3y &= -9 \\ x - 3(0) &= -9 \\ x &= -9 \end{aligned}$$

The x-intercept is -9.

$$\begin{aligned} x - 3y &= -9 \\ (0) - 3y &= -9 \\ -3y &= -9 \\ \frac{-3y}{-3} &= \frac{-9}{-3} \\ y &= 3 \end{aligned}$$

The y-intercept is 3.

**Step 3:** Use the slope formula with the points (-9, 0) and (0, 3).

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{3 - 0}{0 - (-9)} \\ &= \frac{3}{9} \\ &= \frac{1}{3} \end{aligned}$$

The slope of the line described by  $x - 3y = -9$  is  $\frac{1}{3}$ .

Find the slope of the line described by each equation.

4.  $-2x - 5y = 10$

$$-2x - 5y = 10$$

$$-2x - \boxed{0} = 10$$

$$-2x = 10$$

$$\frac{-2x}{-2} = \frac{10}{-2}$$

$$x = -5$$

$$(-5, 0)$$

$x_1$   $y_1$

$$-2x - 5y = 10$$

$$\boxed{0} - 5y = 10$$

$$-5y = 10$$

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

$$y = -2$$

$$(0, -2)$$

$x_2$   $y_2$

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

$$m = \frac{-2 - 0}{0 - (-5)}$$

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

↖

5.  $4x + 2y = 8$

|                              |                              |
|------------------------------|------------------------------|
| $4x + 2y = 8$                | $4x + 2y = 8$                |
| $4x + 0 = 8$                 | $0 + 2y = 8$                 |
| $4x = 8$                     | $2y = 8$                     |
| $(2, 0)$<br>$x_1 \ y_1$      | $(0, 4)$<br>$x_2 \ y_2$      |
| $\frac{4x}{4} = \frac{8}{4}$ | $\frac{2y}{2} = \frac{8}{2}$ |
| $x = 2$                      | $y = 4$                      |

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

$$x_1 - x_2$$

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

$$m = -2$$

6.  $-6x + 2y = 12$

|                                  |                               |
|----------------------------------|-------------------------------|
| $-6x + 2y = 12$                  | $-6x + 2y = 12$               |
| $-6x + 0 = 12$                   | $0 + 2y = 12$                 |
| $-6x = 12$                       | $2y = 12$                     |
| $(-2, 0)$<br>$x_1 \ y_1$         | $(0, 6)$<br>$x_2 \ y_2$       |
| $\frac{-6x}{-6} = \frac{12}{-6}$ | $\frac{2y}{2} = \frac{12}{2}$ |
| $x = -2$                         | $y = 6$                       |

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

$$x_1 - x_2$$

$$m = \frac{0 - 6}{-2 - 0}$$

$$m = 3$$

7.  $8y - 4x = 32$

|                                  |                               |
|----------------------------------|-------------------------------|
| $8y - 4x = 32$                   | $8y - 4x = 32$                |
| $x = -8$                         | $8y = 32$                     |
| $(-8, 0)$<br>$x_1 \ y_1$         | $(0, 4)$<br>$x_2 \ y_2$       |
| $\frac{-4x}{-4} = \frac{32}{-4}$ | $\frac{8y}{8} = \frac{32}{8}$ |
| $x = -8$                         | $y = 4$                       |

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

$$x_1 - x_2$$

$$m = \frac{0 - 4}{-8 - 0}$$

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

8.  $6y + 8x = 24$

|                               |                               |
|-------------------------------|-------------------------------|
| $6y + 8x = 24$                | $6y + 8x = 24$                |
| $8x = 24$                     | $6y = 24$                     |
| $(3, 0)$<br>$x_1 \ y_1$       | $(0, 4)$<br>$x_2 \ y_2$       |
| $\frac{8x}{8} = \frac{24}{8}$ | $\frac{6y}{6} = \frac{24}{6}$ |
| $x = 3$                       | $y = 4$                       |

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

$$x_1 - x_2$$

$$m = \frac{0 - 4}{3 - 0}$$

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