

# Writing the Equation of a Line through a Given Point and Parallel to a Given Line

## • Example 1

Write the equation of the line parallel to the line  $2x - 3y = 6$  that passes through  $(-3, -7)$ .

Two parallel lines are either two vertical lines or two lines having the same slope.

We first find the slope of the line of  $2x - 3y = 6$  by solving for  $y$ .

$$\begin{aligned} 2x - 3y &= 6 \\ -3y &= 6 - 2x \\ y &= \frac{2}{3}x - 2 \end{aligned}$$

Thus, the slope of any line parallel to this line must also be  $\frac{2}{3}$ . In other words, the line that we are looking for has equation

$$y = \frac{2}{3}x + b$$

for some number  $b$ . That line must contain the point  $(-3, -7)$ .

Thus we must have

$$-7 = \frac{2}{3}(-3) + b.$$

Solving for  $b$ , we obtain

$$b = -5$$

Thus the equation of the line is

$$y = \frac{2}{3}x - 5$$

## • • • CHECK YOURSELF 1

Write the equation of the line parallel to the line  $x - 4y = 2$  that passes through  $(8, 7)$ .

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## • • • CHECK YOURSELF ANSWER

1.  $y = \frac{1}{4}x + 5.$

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# 3.17 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

Write the equation of the line parallel to the given line that passes through the given point.

1.  $6x - 3y = 7$ ;  $(-1, -1)$

2.  $8x + 4y = 9$ ;  $(-2, 4)$

3.  $3x + 4y = 7$ ;  $(1, 2)$

4.  $-12x + 4y = 5$ ;  $(1, 10)$

5.  $8x + y = 19$ ;  $(2, 11)$

6.  $4x + y = -3$ ;  $(-2, 4)$

7.  $-x - 2y = 5$ ;  $(5, 9)$

8.  $5x - 5y = 1$ ;  $(7, -2)$

9.  $x + y = 10$ ;  $(0, 9)$

10.  $2x + 6y = 8$ ;  $(6, 6)$