

3.5 Writing Equations of Lines

Solutions

Write the equation in slope-intercept form, $y = mx + b$, of the line with each given slope, m and y -intercept, b .	
<p>1. $m = -5$ and $b = 10$ $y = mx + b$</p> $y = -5x + 10$	<p>2. $m = 3$ and $b = -1$</p>
<p>3. $m = \frac{5}{6}$ and $b = -2$ $y = mx + b$</p> $y = \frac{5}{6}x - 2$	<p>4. $m = -\frac{1}{4}$ and $b = 5$</p>
<p>5. $m = 0$ and $b = 8$ $y = mx + b$</p> $y = 0x + 8$ $y = 8$	<p>6. $m = 0$ and $b = -6$</p>
<p>7. $m = \frac{1}{7}$ and $b = 0$ $y = mx + b$</p> $y = \frac{1}{7}x + 0$ $y = \frac{1}{7}x$	<p>8. $m = -\frac{3}{4}$ and $b = 0$</p>
Write the equation in slope-intercept form, $y = mx + b$, of the line that has the given slope, m and passes through the given point.	
<p>9. slope is -3 and passes through the point $(5, 6)$</p> $y - y_1 = m(x - x_1)$ $y - 6 = -3(x - 5)$ $y - 6 = -3x + 15$ $\quad \underline{+6} \qquad \quad \underline{+6}$ $y = -3x + 21$	<p>10. slope is 4 and passes through the point $(-1, 2)$</p>
<p>Answers: 1. $y = -5x + 10$; 3. $y = \frac{5}{6}x - 2$; 5. $y = 8$; 7. $y = \frac{1}{7}x$; 9. $y = -3x + 21$</p>	

Write the equation in slope-intercept form, $y = mx + b$, of the line that has the given slope, m and passes through the given point.

11. slope is $\frac{1}{2}$ and passes through the point $(4, -5)$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - (-5) &= \frac{1}{2}(x - 4) \\
 y + 5 &= \frac{1}{2}x - \frac{1}{2} \cdot 4 \\
 y + 5 &= \frac{1}{2}x - 2 \\
 \underline{-5} \quad \quad \underline{-5} \\
 y &= \frac{1}{2}x - 7
 \end{aligned}$$

12. slope is $\frac{1}{3}$ and passes through the point $(-9, 1)$

13. slope is 0 and passes through the point $(2, 7)$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - 7 &= 0(x - 2) \\
 y - 7 &= 0 \\
 \underline{+7} \quad \underline{+7} \\
 y &= 7
 \end{aligned}$$

14. slope is 0 and passes through the point $(3, -8)$

15. slope is $-\frac{2}{5}$ and passes through the point $(0, 0)$

$$\begin{aligned}
 y - y_1 &= m(x - x_1) \\
 y - 0 &= -\frac{2}{5}(x - 0) \\
 y &= -\frac{2}{5}x
 \end{aligned}$$

16. slope is $\frac{4}{3}$ and passes through the point $(0, 0)$

Answers: **11.** $y = \frac{1}{2}x - 7$; **13.** $y = 7$; **15.** $y = -\frac{2}{5}x$

Write the equation in slope-intercept form, $y = mx + b$, of the line that has the following characteristics

17. passes through the points

$(-3, 1)$ and $(6, 4)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 1}{6 - (-3)} = \frac{3}{9} = \frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = \frac{1}{3}(x - (-3))$$

$$y - 1 = \frac{1}{3}x + \frac{1}{3} \cdot 3$$

$$y - 1 = \frac{1}{3}x + 1$$

$$\underline{+1} \qquad \underline{+1}$$

$$y = \frac{1}{3}x + 2$$

18. passes through the points

$(-1, 3)$ and $(2, -3)$

19. passes through the points

$(1, 3)$ and $(3, 7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 3}{3 - 1} = \frac{4}{2} = 2$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = 2(x - 1)$$

$$y - 3 = 2x - 2$$

$$\underline{+3} \qquad \underline{+3}$$

$$y = 2x + 1$$

20. passes through the points

$(2, 4)$ and $(1, 6)$

Answers: **17.** $y = \frac{1}{3}x + 2$; **19.** $y = 2x + 1$

Write the equation in slope-intercept form, $y = mx + b$, of the line that has the following characteristics

21. passes through the points

(1, 7) and (3, 7)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 7}{3 - 1} = \frac{0}{2} = 0$$

$$y - y_1 = m(x - x_1)$$

$$y - 7 = 0(x - 1)$$

$$y - 7 = 0$$

$$\underline{+7} \quad \underline{+7}$$

$$y = 7$$

22. passes through the points

(2, 4) and (1, 4)

23. passes through the points

(3, 2) and (6, 4)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{6 - 3} = \frac{2}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = \frac{2}{3}(x - 3)$$

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

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

$$\underline{+2} \quad \underline{+2}$$

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

24. passes through the points

(-2, 4) and (1, -2)

Answers: **21.** $y = 7$; **23.** $y = \frac{2}{3}x$

Write the equation of the line in slope-intercept form, $y = mx + b$ that has the following characteristics:

25. passes through $(2, 4)$ and is parallel to $y = \frac{1}{2}x - 1$.

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

$$y - y_1 = m(x - x_1)$$

$$y - 4 = \frac{1}{2}(x - 2)$$

$$y - 4 = \frac{1}{2}x - \frac{1}{2} \cdot 2$$

$$y - 4 = \frac{1}{2}x - 1$$

$$\begin{array}{r} +4 \\ +4 \end{array}$$

$$y = \frac{1}{2}x + 3$$

26. passes through $(2, 3)$ and is parallel to $y = 3x - 9$.

27. passes through $(1, 2)$ and is perpendicular to $y = \frac{1}{2}x - 1$.

$$m = -2$$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -2(x - 1)$$

$$y - 2 = -2x + 2$$

$$\begin{array}{r} +2 \\ +2 \end{array}$$

$$y = -2x + 4$$

28. passes through $(3, -2)$ and is perpendicular to $y = 3x - 9$.

Answers: **25.** $y = \frac{1}{2}x + 3$; **27.** $y = -2x + 4$