Section 2.3

#1- 6: Use the slope intercept formula to find the slope-intercept form of an equation of a line with *slope m*, passing through the *point* (x, y). Write your answer in *slope − intercept* form.

1) $m = -3$ *point* $(-2, 4)$

$$y = mx + b$$

$$m = -3 \quad x = -2 \quad y = 4$$

$$4 = -3(-2) + b$$

$$4 = 6 + b$$

$$\frac{-6 \quad -6}{-2 = b}$$

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

3) $m = 9$ *point* $(-3, -4)$

$$m = 9$$

$$x = -3$$

$$y = -4$$

$$y = mx + b$$

$$-4 = 9(-3) + b$$

$$-4 = -27 + b$$

$$\frac{+27 \quad\quad +27}{23 = b}$$

$$\boxed{y = 9x + 23}$$

#1- 6: Use the slope intercept formula to find the slope-intercept form of an equation of a line with *slope m*, passing through the *point* (x, y). Write your answer in *slope − intercept* form.

5) $m = \frac{3}{4}$ *point* (5,4)

$$y = mx + b$$

$$4 = \frac{3}{4} \cdot 5 + b$$

$$\frac{4}{1} = \frac{3}{4} \cdot \frac{5}{1} + b$$

$$\frac{(4)4}{(4)1} = \frac{15}{4} + b$$

$$\frac{16}{4} = \frac{15}{4} + b$$

$$-\frac{15}{4} \quad -\frac{15}{4}$$

$$\overline{\quad 1/4 = b \quad}$$

$$\boxed{y = \frac{3}{4}x + \frac{1}{4}}$$

#7-12: Use the point slope formula to find the equation of a line with slope m, passing through the point (x, y). Write your answer in slope-intercept form.

7) $m = 2$ $point$ $(-1, -4)$

$$y - (-4) = 2(x - (-1))$$

$$y + 4 = 2(x + 1)$$

$$y + 4 = 2x + 2$$
$$- 4 - 4$$

$$\boxed{y = 2x - 2}$$

#7-12: Use the point slope formula to find the equation of a line with slope m, passing through the point (x, y). Write your answer in slope-intercept form.

9) $m = -3$ *point* (8,2)

$$y - 2 = -3(x - 8)$$

$$y - 2 = -3x + 24$$
$$ + 2 \qquad\qquad + 2$$

$$y = -3x + 26$$

#7-12: Use the point slope formula to find the equation of a line with slope m, passing through the point (x, y). Write your answer in slope-intercept form.

11) $m = \frac{-3}{4}$ *point* (9,1)

$$y - 1 = \frac{-3}{4}(x - 9)$$

$$\frac{-3}{4} \cdot -9 = \frac{-3}{4} \cdot \frac{-9}{1} = \frac{27}{4}$$

$$y - 1 = \frac{-3}{4}x + \frac{27}{4}$$

$$y - \frac{14}{14} = \frac{-3}{4}x + \frac{27}{4}$$

$$y - \frac{4}{4} = \frac{-3}{4}x + \frac{27}{4}$$

$$+\frac{4}{4} \qquad\qquad\qquad +\frac{4}{4}$$

$$\boxed{y = \frac{-3}{4}x + \frac{31}{4}}$$

#13-16: Use the point slope formula to find the equation of a line passing through the points (x_1, y_1) and (x_2, y_2). Write your answer in slope-intercept form.

13) $(5,6)$ and $(4,7)$

$$M = \frac{7-6}{4-5} = \frac{1}{-1}$$

$$M = -1$$

$$y - 6 = -1(x-5)$$

$$y - 6 = -1x + 5$$
$$\underline{ +6 \qquad\quad +6}$$

$$\boxed{\begin{array}{c} y = -1x + 11 \\ or \\ y = -x + 11 \end{array}}$$

#13-16: Use the point slope formula to find the equation of a line passing through the points (x_1, y_1) and (x_2, y_2). Write your answer in slope-intercept form.

15) $(1,14)$ and $(4,10)$

$$M = \frac{10-14}{4-1} = -\frac{4}{3}$$

$$y - 10 = -\frac{4}{3}(x-4)$$

$$y - 10 = -\frac{4}{3}x + \frac{16}{3}$$

$$y - \frac{10}{1} \cdot \frac{3}{3} = -\frac{4}{3}x + \frac{16}{3}$$

$$y - \frac{30}{3} = -\frac{4}{3}x + \frac{16}{3}$$

$$\underline{+ \frac{30}{3} \qquad\qquad\qquad + \frac{30}{3}}$$

$$\boxed{y = -\frac{4}{3}x + \frac{46}{3}}$$

#17-20: Find the slope-intercept form of the equation of a line passing through the point (x, y) that is parallel to the given line.

17) $point\ (3, -6)\ parallel\ to\ y = 5x - 4$

$$M = 5$$

$$POINT\ (3, -6)$$

$$y - (-6) = 5(x - 3)$$

$$\begin{array}{c} y + 6 = 5x - 15 \\ -6 \qquad\quad -6 \end{array}$$

$$\boxed{y = 5x - 21}$$

19) *point* $(8, -3)$ *parallel to* $y = \frac{3}{4}x + 1$

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

POINT $(8, -3)$ ✳

$$y - (-3) = \frac{3}{4}(x - 8)$$

$$y + 3 = \frac{3}{4}x - 6$$
$$-3 \qquad\qquad -3$$

$$\boxed{y = \frac{3}{4}x - 9}$$

✳ $\frac{3}{4} \cdot -8$

$\frac{3}{4} \cdot -\frac{8}{1}$

$= -\frac{24}{4}$

$= -6$

#21-24: Find the slope-intercept form of the equation of a line passing through the point (x, y) that is perpendicular to the given line.

21) *point* $(5, 7)$ *perpendicular to* $y = \frac{-1}{3}x + 3$

M given line $-\frac{1}{3}$

M desired line $+\frac{3}{1} = 3$

$$y - 7 = 3(x - 5)$$

$$y - 7 = 3x - 15$$
$$+7 \qquad\qquad +7$$

$$\boxed{y = 3x - 8}$$

#21-24: Find the slope-intercept form of the equation of a line passing through the point (x, y) that is perpendicular to the given line.

23) $point\ (-8, -1)\ perpendicular\ to\ y = \frac{2}{5}x + 1$

$$\text{Slope given line } m = \frac{2}{5}$$

$$\text{Slope desired line } m = \frac{-5}{2}$$

$$y - (-1) = \frac{-5}{2}(x - (-8))$$

$$y + 1 = \frac{-5}{2}(x + 8)$$

$$y + 1 = \frac{-5}{2}x - 20$$
$$\underline{-1 \qquad\qquad -1}$$

$$\boxed{y = \frac{-5}{2}x - 21}$$

#25-28: Find the equation of the vertical line passing through the point (x, y).

25) *point* (2,3)

Vertical→only has X

$$X = 2$$

27) *point* (−2, −1)

$$X = -2$$

#29-32: Find the equation of the horizontal line passing through the point (x ,y).

29) *point* (7,5)

horizontal →
only has a y

$$y = 5$$

31) *point* (2, −3)

$$y = -3$$