p. 197, #1-18 all, #25, #26, #29

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

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

The equation is $y - 1 = 2(x - 2)$.

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

$y - 5 = -1(x - 3)$

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

The equation is $y - 5 = -(x - 3)$.

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

$y - (-4) = -6(x - 7)$

$y + 4 = -6(x - 7)$

The equation is $y + 4 = -6(x - 7)$.

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

$y - (-2) = 5[x - (-8)]$

$y + 2 = 5(x + 8)$

The equation is $y + 2 = 5(x + 8)$.

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

$y - 0 = -3\left(x - \frac{5}{6}\right)$

$y = -3\left(x - \frac{5}{6}\right)$

The equation is $y = -3\left(x - \frac{5}{6}\right)$.

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

$y - \left(-\frac{1}{2}\right) = \frac{3}{4}(x - 0)$

$y + \frac{1}{2} = \frac{3}{4}x$

The equation is $y + \frac{1}{2} = \frac{3}{4}x$.

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

$y - (-12) = -\frac{2}{5}(x - 5)$

$y + 12 = -\frac{2}{5}(x - 5)$

The equation is $y + 12 = -\frac{2}{5}(x - 5)$.

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

$y - 8.2 = 1.5[x - (-6)]$

$y - 8.2 = 1.5(x + 6)$

The equation is $y - 8.2 = 1.5(x + 6)$.

9. $m = \dfrac{1-(-3)}{3-1} = \dfrac{1+3}{3-1} = \dfrac{4}{2} = 2$

$$y - y_1 = m(x - x_1)$$
$$y - 1 = 2(x - 3)$$
$$y - 1 = 2(x) - 2(3)$$
$$y - 1 = x - 6$$
$$\underline{+1} \qquad \underline{+1}$$
$$y = 2x - 5$$

The equation is $y = 2x - 5$.

10. $m = \dfrac{-5-0}{1-(-4)} = \dfrac{-5-0}{1+4} = \dfrac{-5}{5} = -1$

$$y - y_1 = m(x - x_1)$$
$$y - 0 = -1[x - (-4)]$$
$$y = -1(x + 4)$$
$$y = -x - 4$$

The equation is $y = -x - 4$.

11. $m = \dfrac{4-2}{-6-(-2)} = \dfrac{4-2}{-6+2} = \dfrac{2}{-4} = -\dfrac{1}{2}$

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

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

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

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

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

$$\underline{+2} \qquad \underline{+2}$$

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

The equation is $y = -\frac{1}{2}x + 1$

12. $m = \dfrac{4-1}{8-4} = \dfrac{3}{4}$

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

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

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

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

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

$$y = \frac{3}{4}x - 2$$

The equation is $y = \frac{3}{4}x - 2$.

13. $m = \dfrac{12-2}{2-7} = \dfrac{10}{-5} = -2$

$$y - y_1 = m(x - x_1)$$
$$y - 2 = -2(x - 7)$$
$$y - 2 = -2(x) - 2(-7)$$
$$y - 2 = -2x + 14$$
$$\underline{+2} \qquad \underline{+2}$$
$$y = -2x + 16$$

The equation is $y = -2x + 16$.

14. $m = \dfrac{1-(-2)}{12-6} = \dfrac{1+2}{12-6} = \dfrac{3}{6} = \dfrac{1}{2}$

$$y - y_1 = m(x - x_1)$$
$$y - (-2) = \frac{1}{2}(x - 6)$$
$$y + 2 = \frac{1}{2}(x) - \frac{1}{2}(6)$$
$$y + 2 = \frac{1}{2}x - 3$$
$$\underline{-2} \qquad \underline{-2}$$
$$y = \frac{1}{2}x - 5$$

The equation is $y = \frac{1}{2}x - 5$.

15. $m = \dfrac{-9-(-9)}{-3-1} = \dfrac{-9+9}{-3-1} = \dfrac{0}{-4} = 0$

$$y - y_1 = m(x - x_1)$$
$$y - (-9) = 0(x - 1)$$
$$y + 9 = 0$$
$$\underline{-9} \quad \underline{-9}$$
$$y = -9$$

The equation is $y = -9$.

16. $m = \dfrac{13-19}{5-(-5)} = \dfrac{13-19}{5+5} = \dfrac{-6}{10} = -\dfrac{3}{5}$

$$y - y_1 = m(x - x_1)$$
$$y - 13 = -\frac{3}{5}(x - 5)$$
$$y - 13 = -\frac{3}{5}(x) - \frac{3}{5}(-5)$$
$$y - 13 = -\frac{3}{5}x + 3$$
$$\underline{+13} \quad \underline{+13}$$
$$y = -\frac{3}{5}x + 16$$

The equation is $y = -\frac{3}{5}x + 16$.

17. $m = \dfrac{\frac{25}{3} - 11}{2 - 6} = \dfrac{\frac{25}{3} - \frac{33}{3}}{-4} = \dfrac{-\frac{8}{3}}{-4} = -\dfrac{8}{3}\left(-\dfrac{1}{4}\right) = \dfrac{2}{3}$

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

$$y - 11 = \frac{2}{3}(x - 6)$$

$$y - 11 = \frac{2}{3}x - 4$$

$$\underline{+\,11} \qquad \underline{+\,11}$$

$$y = \frac{2}{3}x + 7$$

The equation is $y = \frac{2}{3}x + 7$.

18. $m = \dfrac{\frac{1}{8} - (-3)}{-\frac{1}{2} - 2} = \dfrac{\frac{1}{8} + 3}{-\frac{1}{2} - \frac{4}{2}} = \dfrac{\frac{1}{8} + \frac{24}{8}}{-\frac{5}{2}} = \dfrac{\frac{25}{8}}{-\frac{5}{2}}$

$$= \frac{25}{8}\left(-\frac{2}{5}\right) = -\frac{5}{4}$$

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

$$y - (-3) = -\frac{5}{4}(x - 2)$$

$$y + 3 = -\frac{5}{4}x + \frac{5}{2}$$

$$\underline{-\,3} \qquad \underline{-\,3}$$

$$y = -\frac{5}{4}x - \frac{1}{2}$$

The equation is $y = -\frac{5}{4}x - \frac{1}{2}$.

25. $\frac{5-(-1)}{4-2}=\frac{5+1}{4-2}=\frac{6}{2}=3, \frac{15-5}{6-4}=\frac{10}{2}=5,$

$$\frac{29-15}{8-6}=\frac{14}{2}=7$$

$$\frac{47-29}{10-8}=\frac{18}{2}=9$$

Because the y-values are not changing at a constant rate, the data cannot be modeled by a linear equation.

26. $\frac{1.4-1.2}{1-0}=\frac{0.2}{1}=0.2, \frac{1.6-1.4}{2-1}=\frac{0.2}{1}=0.2,$

$$\frac{2-1.6}{4-2}=\frac{0.4}{2}=0.2$$

$$\begin{aligned} y-y_1 &= m(x-x_1) \\ y-2 &= 0.2(x-4) \\ y-2 &= 0.2(x)-0.2(4) \\ y-2 &= 0.2x-0.8 \\ \underline{+2} & \qquad \underline{+2} \\ y &= 0.2x+1.2 \end{aligned}$$

Because the y-values increase at a constant rate, the data can be modeled by a linear equation. A linear model is $y = 0.2x + 1.2$.

29. The values that are substituted for x_1 and y_1 should be from the same point.

$$m = \frac{3-2}{4-1} = \frac{1}{3}$$

Let $(x_1, y_1) = (1, 2)$.

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

$$y - 2 = \frac{1}{3}(x - 1)$$

An equation is $y - 2 = \frac{1}{3}(x - 1)$.