3. \(4x + 9y = 3\) \hspace{1cm} \text{solve for } y \text{ to get } y = mx + b \text{ form}

\[9y = -4x + 3\]

\[y = -\frac{4}{9}x + \frac{1}{3}\]

\[m = -\frac{4}{9}, \quad b = y_{\text{int}} = \frac{1}{3}\]

\[x_{\text{int}} (y = 0)\]

\[4x + 9(0) = 3\]

\[x = \frac{3}{4}\]

\[y = \frac{3}{4} x + \frac{3}{4}\]

11. \(m = 3, \quad (7, 9)\) \hspace{1cm} \(y - y_1 = m(x - x_1)\)

\[y - 9 = 3(x - 7)\]

\[y - 9 = 3x - 21\]

\[y = 3x - 12\]

13. \text{horizontal through } (0, -2) \hspace{1cm} \Rightarrow \hspace{1cm} y = -2

23. \(m = \frac{0 - 3}{4 - 0} = -\frac{3}{4}\)

\(m = -\frac{3}{4}, \quad (0, 3)\) \hspace{1cm} \(y - y_1 = m(x - x_1)\)

\[y - 3 = -\frac{3}{4}(x - 0)\]

\[y = -\frac{3}{4}x + 3\]

33. \text{slope from 20 to 30} \Rightarrow \quad m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2}{10} = .02

\text{slope from 30 to 40} \Rightarrow \quad m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{17}{10} = .017

\text{Lines must have constant slope. Since the slope of this function changes it cannot be a line.}
39. \( y = x^2 + 6x + 2 \)

\[ y = (x^2 + 6x + 9) + 2 - 9 \]

\[ y = (x+3)^2 - 7 \]

This is \( y = x^2 \) shifted 3 left, 7 down.

Minimum at \((-3, -7)\)

43. \( y = 4x - 12x^2 = -12x^2 + 4x = -12 \left( x^2 - \frac{4}{12} x \right) = -12 \left( x^2 - \frac{1}{3} x \right) \)

\[ y = -12 \left( x^2 - \frac{1}{3} x + \frac{1}{36} \right) + \frac{1}{36} \left( 12 \right) = -12 \left( x - \frac{1}{6} \right)^2 + \frac{1}{3} \]

\( \left( \frac{1}{6} \right)^2 = \frac{1}{36} \)

Maximum at \( \left( \frac{1}{6}, \frac{1}{3} \right) \)

*Note: You need to be comfortable with the complete square portion of these problems. Finding answers on calculator will not be sufficient.*