

Sec. 3.1

p. 126 #27, 31, 35, 37, 51-56

(27) $f(x) = 2x^2 + 10x$ $a = 3$

$$\lim_{x \rightarrow 3} \frac{2x^2 + 10x - 48}{x - 3} = \lim_{x \rightarrow 3} \frac{2(x^2 + 5x - 24)}{x - 3}$$

$$= \lim_{x \rightarrow 3} \frac{2(x + 8)(x - 3)}{x - 3} = \lim_{x \rightarrow 3} 2(x + 8) = 22$$

$$\boxed{y - 48 = 22(x - 3)}$$

(31) $f(x) = x^3 + x$ $a = 0$

$$\lim_{x \rightarrow 0} \frac{x^3 + x - 0}{x - 0} = \lim_{x \rightarrow 0} \frac{x(x^2 + 1)}{x} = \lim_{x \rightarrow 0} x^2 + 1 = 1$$

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

$$\boxed{y = 1}$$

(35) $f(x) = \frac{1}{x + 3}$ $a = -2$

$$\lim_{x \rightarrow -2} \frac{1}{x + 3} - 1 = \lim_{x \rightarrow -2} \frac{1 - x - 3}{x + 3} = \lim_{x \rightarrow -2} \frac{-x - 2}{x + 3}$$

$$\lim_{x \rightarrow -2} \frac{-1(x + 2)}{x + 3} \cdot \frac{1}{x + 2} = \lim_{x \rightarrow -2} \frac{-1}{x + 3} = -1$$

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

$$\textcircled{37} f(x) = \sqrt{x+4} \quad a=1$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{x+4} - \sqrt{5}}{x-1} \cdot \frac{(\sqrt{x+4} + \sqrt{5})}{(\sqrt{x+4} + \sqrt{5})} = \lim_{x \rightarrow 1} \frac{\overset{(x-1)}{x+4-5}}{(x-1)(\sqrt{x+4} + \sqrt{5})}$$

$$\lim_{x \rightarrow 1} \frac{1}{\sqrt{x+4} + \sqrt{5}} = \frac{1}{2\sqrt{5}}$$

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