

Pg. 511 #5-27 (odd), 65, 66

$$5) a) \lim_{x \rightarrow 4} \frac{3(x-4)}{(x-4)(x+4)} = \frac{3}{8}$$

$$b) \lim_{x \rightarrow 4} \frac{3}{2x} = \frac{3}{8}$$

$$7) a) \lim_{x \rightarrow 6} \frac{\sqrt{x+10} - 4}{x-6} \left(\frac{\sqrt{x+10} + 4}{\sqrt{x+10} + 4} \right) = \lim_{x \rightarrow 6} \frac{(x-6)}{(x-6)\sqrt{x+10} + 4} = \frac{1}{8}$$

$$b) \lim_{x \rightarrow 6} \frac{\frac{1}{2}(x+10)^{-1/2}}{1} = \lim_{x \rightarrow 6} \frac{1}{2\sqrt{x+10}} = \frac{1}{8}$$

$$9) a) \lim_{x \rightarrow \infty} \frac{\frac{5x^2}{x^2} - \frac{3x}{x^2} + \frac{1}{x^2}}{\frac{3x^2}{x^2} - \frac{5}{x^2}} = \frac{5}{3}$$

$$b) \lim_{x \rightarrow \infty} \frac{10x - 3}{6x} = \lim_{x \rightarrow \infty} \frac{10}{6} = \frac{5}{3}$$

$$11) \lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3} = \lim_{x \rightarrow 3} \frac{2x - 2}{1} = 4$$

$$13) \lim_{x \rightarrow 0} \frac{\sqrt{25-x^2} - 5}{x} = \lim_{x \rightarrow 0} \frac{\frac{1}{2}(25-x^2)^{-1/2}(-2x)}{1}$$

$$= \lim_{x \rightarrow 0} \frac{-x}{\sqrt{25-x^2}} = \frac{0}{5} = 0$$

$$15) \lim_{x \rightarrow 0^+} \frac{e^x}{3x^2} = \infty \quad \text{dividing by infinitely small} \\ \# \text{ so makes } \infty$$

$$17) \lim_{x \rightarrow 1} \frac{x^{11} - 1}{x^4 - 1} = \lim_{x \rightarrow 1} \frac{11x^{10}}{4x^3} = \lim_{x \rightarrow 1} \frac{11x^7}{4} = \frac{11}{4}$$

$$19) \lim_{x \rightarrow 0} \frac{3 \cos 3x}{5 \cos 5x} = \frac{3}{5}$$

$$21) \lim_{x \rightarrow 0} \frac{1}{\sqrt{1+x^2}} = 1$$

$$23) \lim_{x \rightarrow \infty} \frac{10x+3}{8x} = \lim_{x \rightarrow \infty} \frac{10}{8} = \frac{5}{4}$$

$$25) \lim_{x \rightarrow \infty} \frac{2x+4}{1} = \infty$$

$$27) \lim_{x \rightarrow \infty} \frac{3x^2}{\frac{1}{2}e^{x/2}} = -\lim_{x \rightarrow \infty} \frac{6x}{\frac{1}{4}e^{x/2}} = -\lim_{x \rightarrow \infty} \frac{6}{\frac{1}{8}e^{x/2}} = \frac{48}{\infty} = 0$$

$$65) a) \lim_{x \rightarrow 2} \frac{x-2}{x^3-x-6} \Rightarrow \frac{0}{0} \quad \text{Yes, can use L'Hopital's}$$

$$b) \lim_{x \rightarrow 0} \frac{x^2-4x}{2x-1} \Rightarrow \frac{0}{-1} \quad \text{No, cannot use}$$

$$c) \lim_{x \rightarrow \infty} \frac{x^3}{e^x} \Rightarrow \frac{\infty}{\infty} \quad \text{Yes, can use}$$

$$d) \lim_{x \rightarrow 3} \frac{e^{x^2}-e^9}{x-3} \Rightarrow \frac{0}{0} \quad \text{Yes, can use}$$

$$e) \lim_{x \rightarrow 1} \frac{\cos \pi x}{\ln x} \Rightarrow \frac{-1}{0} \quad \text{No, cannot use}$$

$$f) \lim_{x \rightarrow 1} \frac{1+x(\ln x-1)}{(x-1)\ln x} \Rightarrow \frac{0}{0} \quad \text{Yes, can use}$$

$$66) a) \infty$$

$$b) -\infty$$

c) Does not exist