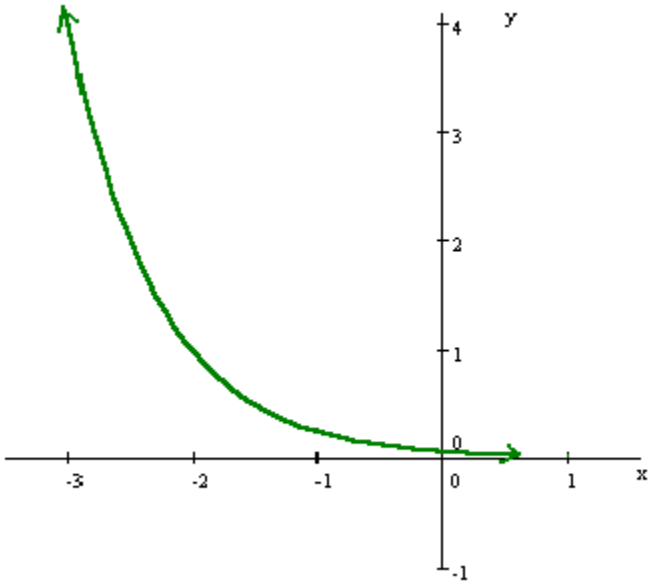
Math 152 Quiz 1 Name: KEY

Show all of your work. Your answers must be fully justified to receive credit.

1. Make a careful sketch of the function $f(x) = \left(\frac{1}{4}\right)^{x+2}$



2. Find the indicated limit.

(a) $\lim_{x\to\infty} 5^{-x/2}$

$$\lim_{x\to\infty} 5^{\overbrace{-x/2}^{-\infty}} = 0$$

(b) $\lim_{x\to 1} \dfrac{x-1}{x^3+2x^2+x-4}$

$$\lim_{x\to 1} \frac{\overbrace{x-1}^{0}}{\underbrace{x^3+2x^2+x-4}_{0}} \overset{\checkmark}{=} \lim_{x\to 1} \frac{1}{3x^2+4x+1} = \frac{1}{8}$$

(c) $\lim_{x\to 0} \dfrac{\sin x - x\cos x}{x^3}$

$$\lim_{x\to 0} \frac{\overbrace{\sin x - x\cos x}^{0}}{\underbrace{x^3}_{0}} \overset{\checkmark}{=} \lim_{x\to 0} \frac{\cos x - \cos x + x\sin x}{3x^2} = \lim_{x\to 0} \frac{x\sin x}{3x^2} = \lim_{x\to 0} \frac{\overbrace{\sin x}^{0}}{\underbrace{3x}_{0}} \overset{\checkmark}{=} \lim_{x\to 0} \frac{\cos x}{3} = \frac{1}{3}$$