

Exam 2 Prob. 3

$$f(x) = \sqrt{4+3x^2} \quad \boxed{f(2) = \sqrt{4+3 \cdot 2^2} = \sqrt{4+12} = \sqrt{16} = 4}$$

$$f'(x) = \frac{1}{2}(4+3x^2)^{-\frac{1}{2}}(6x) \quad \boxed{f'(2) = \frac{1}{2} \cdot \frac{1}{4}(6 \cdot 2) = \frac{12}{8} = \frac{3}{2}}$$

$$L(x) = f(a) + f'(a)(x-a)$$

$$a=2 \quad L(1.97) = 4 + \left(\frac{3}{2}\right)(1.97-2)$$

$$x = 1.97 \\ = 4 + \frac{3}{2}(-.03)$$

Exam 2 Prob. 4

$$\lim_{x \rightarrow 0} \frac{x}{\sqrt{4+3x}-2} \cdot \frac{\sqrt{4+3x}+2}{\sqrt{4+3x}+2} = \lim_{x \rightarrow 0} \frac{x(\sqrt{4+3x}+2)}{4+3x-4}$$
$$= \frac{1}{3}(\sqrt{4}+2) = \frac{4}{3}$$

$$\lim_{x \rightarrow 0} \frac{x}{\sqrt{4+3x}-2} \stackrel{0}{=} \lim_{x \rightarrow 0} \frac{1}{\frac{1}{2}(4+3x)^{-\frac{1}{2}}(3)} = \frac{1}{\frac{1}{2} \cdot \frac{1}{2} \cdot 3} = \frac{1}{\frac{3}{4}} = \frac{4}{3}$$