4. (a) (1,0) Seja $f(x) = \operatorname{arcsen}(\sqrt{1-x^4})$. Calcule $f'(0)$.

(b) (1,0) Seja $g(x) = (2+\cos x)^{1/x^2}$. Calcule $g'(x)$.

a) $\lim_{x\to 0} f(x) = \lim_{x\to 0} \operatorname{arc\,sen}\left(\sqrt{1-x^4}\right) = \operatorname{arc\,sen}(1) = f(0)$

$\therefore \lim_{x\to 0} \left[f(x) - f(0) \right] = 0$

$$f'(0) = \lim_{x\to 0} \frac{\overbrace{f(x)-f(0)}^{\to 0}}{\underbrace{x-0}_{0}} \overset{L'H}{=} \lim_{x\to 0} \frac{f'(x)}{1} =$$

$$= \lim_{x\to 0} \frac{1}{\sqrt{1-\left(\sqrt{1-x^4}\right)^2}} \cdot \frac{-4x^3}{2\sqrt{1-x^4}} =$$

$$= \lim_{x\to 0} \frac{1}{\sqrt{x^4}} \cdot \frac{-2x^3}{\sqrt{1-x^4}} = \lim_{x\to 0} \frac{-2x}{\sqrt{1-x^4}} = 0$$

b)

$$g(x) = (2+\cos x)^{1/x^2} = e^{\frac{\ln(2+\cos x)}{x^2}}$$

$$g'(x) = e^{\frac{\ln(2+\cos x)}{x^2}} \frac{1}{x^4} \left[\frac{-\operatorname{sen} x}{2+\cos x} \cdot x^2 - 2x \ln(2+\cos x) \right]$$