

1.

$$a. \lim_{x \rightarrow 0} \frac{3 \operatorname{sen}(x)}{2x} = \frac{3}{2} \cdot \left(\lim_{x \rightarrow 0} \frac{\operatorname{sen}(x)}{x} \right) = \frac{3}{2} \cdot 1 = \frac{3}{2}$$

$$b. \lim_{x \rightarrow 0} \frac{\tan(3x)}{5x} = \lim_{x \rightarrow 0} \frac{1}{5x} \cdot \frac{\operatorname{sen}(3x)}{\cos(3x)} = \lim_{x \rightarrow 0} \frac{\operatorname{sen}(3x)}{5x} \cdot \frac{1}{\cos(3x)} = \lim_{x \rightarrow 0} \frac{3}{5} \cdot \left(\frac{\operatorname{sen}(3x)}{3x} \right) \cdot \frac{1}{\cos(3x)} = \frac{3}{5} \cdot 1 \cdot 1 = \frac{3}{5}$$

2.

$$a. f(x) = (5 - 3x + 2x^5)^{11}$$

$$f'(x) = 11(5 - 3x + 2x^5)^{10} \cdot (10x^4 - 3)$$

$$b. f(x) = \left(3 - \frac{5}{x^2}\right)^7$$

$$f'(x) = 7 \left(3 - \frac{5}{x^2}\right)^6 \cdot \frac{10}{x^3}$$

$$c. f(x) = x^5 \cdot \left(1 - \frac{2}{x}\right)^{17}$$

$$f'(x) = 5x^4 \cdot \left(1 - \frac{2}{x}\right)^{17} + \left(17 \left(1 - \frac{2}{x}\right)^{16} \cdot \frac{2}{x^2}\right) \cdot x^5$$

$$d. f(x) = \sqrt{2x - x^5}$$

$$f'(x) = \sqrt{2x - x^5} = \frac{1}{2\sqrt{2x - x^5}} \cdot (2 - 5x^4)$$

$$e. f(x) = \frac{2+x}{(3-2x)^{10}}$$

$$f'(x) = -\frac{1 \cdot (3-2x)^{10} + 20(3-2x)^9 \cdot (2+x)}{40(3-2x)^{19}}$$

$$f. f(t) = \operatorname{sen}(2t) + \operatorname{sen}^2(5t)$$

$$f'(t) = 2t \cdot \left(\frac{\operatorname{sen}(2t)}{2t}\right) + 2.5t \cdot \left(\frac{\operatorname{sen}(5t)}{5t}\right) = 2t \cdot 1 + 10t \cdot 1 = 12t$$

$$g. f(t) = (2 - 4t)^4 + \cos\left(\frac{\pi}{2}t^2\right)$$

$$f'(t) = -16(2 - 4t)^3 - \operatorname{sen}\left(\frac{\pi}{2}t^2\right) = -16(2 - 4t)^3 - \frac{\pi}{2}t^2 \cdot \left(\frac{\operatorname{sen}\left(\frac{\pi}{2}t^2\right)}{\frac{\pi}{2}t^2}\right) = -16(2 - 4t)^3 - \frac{\pi}{2}t^2$$

$$h. f(t) = (5 + 6t)^6 \cdot \cos(\pi t^2)$$

$$f'(t) = 36(5 + 6t)^5 \cdot \pi t^2 \cdot \left(-\frac{\operatorname{sen}(\pi t^2)}{\pi t^2}\right) = 36(5 + 6t)^5 \cdot \pi t^2 \cdot (-1) = -\pi t^2 \cdot 36(5 + 6t)^5$$

$$3. f(x) = [3 + \operatorname{sen}(3x)]^3$$

$$f'(x) = 3[3 + \operatorname{sen}(3x)]^2 \cdot \cos(3x)$$

$$f'(7) = 3[3 + \operatorname{sen}(21)]^2 \cdot \cos(21) = 66,62$$

Resposta: letra d

$$4. B(t) = 4 + 0,35 \operatorname{sen}\left(\frac{2\pi t}{5,4}\right)$$

$$a. B'(t) = 0,35 \cos\left(\frac{2\pi t}{5,4}\right)$$

$$b. B'(1) = 0,35 \cos\left(\frac{2\pi \cdot 1}{5,4}\right) = 0,13862791811$$

$$5. A = \pi r^2 \rightarrow 16 = \pi r^2 \rightarrow r^2 = \frac{16}{\pi} \rightarrow r = \frac{4}{\sqrt{\pi}} \cdot \frac{\sqrt{\pi}}{\sqrt{\pi}} = \frac{4\sqrt{\pi}}{\pi}$$

$$\frac{dA}{dt} = 2\pi r \frac{dr}{dt} \rightarrow 7 = 2\pi \cdot \frac{4\sqrt{\pi}}{\pi} \frac{dr}{dt} \rightarrow \frac{dr}{dt} = \frac{8\sqrt{\pi}}{7}$$