

Avaliação

1) Determine a taxa média de variação da função real definida por $f(x) = 5x^2 - 7x + 1$ entre os pontos 1 e 2.

$$\left. \begin{array}{l} f(x_0) = 1 \\ f(x_0 + \Delta x) = 2 \end{array} \right\} \rightarrow \left. \begin{array}{l} f(x_0) = f(1) = 5 \cdot 1^2 - 7 \cdot 1 + 1 = -3 \\ f(x_0 + \Delta x) = f(2) = 5 \cdot 2^2 - 7 \cdot 2 + 1 = 5 \end{array} \right\}$$

$$\Delta MV = f(x_0 + \Delta x) - f(x_0)$$

$$\Delta MV = \frac{5 - (-3)}{1} = \frac{8}{1} = 8 //$$

2) Determinar a derivada no ponto $x_0 = 2$ da função real definida por $f(x) = 5x^2 - 7x + 1$

$$f(2) = 5 \cdot 2^2 - 7 \cdot 2 + 1 = 7$$

$$f(x_0 + \Delta x) = f(2 + \Delta x) = 5(2 + \Delta x)^2 - 7(2 + \Delta x) + 1$$

$$= 5(4 + 4\Delta x + \Delta x^2) - 14 - 7\Delta x + 1$$

$$= \underset{3}{20} + \underset{2}{20\Delta x} + \underset{1}{5\Delta x^2} - \underset{3}{14} - \underset{2}{7\Delta x} + 1 = 5\Delta x^2 + 13\Delta x + 7$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x_0 + \Delta x) - f(x_0)}{\Delta x}$$

$$f'(2) = \lim_{\Delta x \rightarrow 0} \frac{5\Delta x^2 + 13\Delta x + 7 - 7}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{5\Delta x^2 + 13\Delta x}{\Delta x}$$

$$\lim_{\Delta x \rightarrow 0} \Delta x (5\Delta x + 13) = \lim_{\Delta x \rightarrow 0} 5\Delta x + 13 = 5 \cdot 0 + 13 = 13 //$$