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$-\left[x^2+2x(\Delta x-3)+\Delta x^2-6\Delta x+9\right]$

$-x^2-2x\Delta x+6x-\Delta x^2+6\Delta x-9$

# Trabalho de CDI 1 para entregar

tangente: $y-y_0=\frac{dy}{dx}(x-x_0)$

Para $y=x^2$

$\frac{dy}{dx}=\lim_{\Delta x\to 0}\frac{x^2+(x+\Delta x)^2}{\Delta x} \Rightarrow \lim_{\Delta x\to 0}\frac{x^2-x^2+2x\Delta x-\Delta x^2}{\Delta x}=\lim_{\Delta x\to 0} 2x-\Delta x=2x$

Para $y=2+(x-3)^2$

$\frac{dy}{dx}=\lim_{\Delta x\to 0}\frac{2+(x-3)^2-2-(x+\Delta x-3)^2}{\Delta x}=\lim_{\Delta x\to 0}\frac{x^2-6x+9-\left[x^2+2x(\Delta x-3)+\Delta x^2-6\Delta x+9\right]}{\Delta x}$

$\Rightarrow \lim_{\Delta x\to 0}\frac{-6x+9+2x\Delta x+6x-\Delta x^2-6\Delta x-9}{\Delta x}=2x-6$

tangente à $y=x^2$: $y-y_0=2x(x-x_0)$

" " $y=2+(x-3)^2$: $y-y_0=(2x-6)(x-x_0)$

$\begin{cases} y=x_1 m_t+k \\ y=x_1^2 \\ 2x_1=m_t \end{cases} \Rightarrow y=2x_1^2+k=x_1^2$

$k=-x_1^2$

$\begin{cases} y=x_2 m_t+k \\ y=2+(x_2-3)^2 \\ 2x_2-6=m_t \end{cases} \Rightarrow 2x_2^2-6x_2+k=2+x_2^2-6x+9$

$x_2^2+k=11$

$k=11-x_2^2$

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$$\begin{cases} K + x_1^2 = 0 \\ K - 11 + x_2^2 = 0 \\ 2x_2 - 6 = mt \\ 2x_1 = mt \end{cases} \Rightarrow 2x_2 - 6 = 2x_1$$

$x_1^2 - (-11 + x_2^2) = 0 \Rightarrow x_1^2 = -11 + x_2^2$

$x_1^2 = -11 + (x_1 + 3)^2$

$x_1^2 = -11 + x_1^2 + 6x_1 + 9$

$x_1 = \frac{2}{6} \Rightarrow x_1 = \frac{1}{3}$

$x_2 - 3 = x_1$

$x_2 = \frac{1}{3} + 3$

$x_2 = \frac{10}{3}$

$y_2 = 2 + (x_1 - 3)^2$

$y_2 = 2 + \frac{1}{9} \Rightarrow y_2 = \frac{19}{9}$ $\quad P\left(\frac{10}{3}, \frac{19}{9}\right)$

$y_1 = x_1^2$

$y_1 = \frac{1}{9}$ $\quad P\left(\frac{1}{3}, \frac{1}{9}\right)$

reta tangente comum às duas: $y - \frac{1}{9} = 2 \cdot \frac{1}{3}\left(x - \frac{1}{3}\right)$

$\Rightarrow \boxed{y = \frac{2x}{3} - \frac{1}{9}}$