* PÁGINA 200 DO LIVRO MATEMÁTICA 1 PARA OS CURSOS DE ECONOMIA, ADMINISTRAÇÃO E CIÊNCIAS CONTÁBEIS (MEDEIROS, 5ª EDIÇÃO, EDITORA ATLAS)



$y''' = (-2(-x^{-2-1}))\frac{1}{\ln 10} + 0$

$y''' = 2x^{-3}\frac{1}{\ln 10}$

$y''' = 2 \cdot \frac{1}{x^3} \cdot \frac{1}{\ln 10}$

$y''' = \frac{2}{\ln 10} \cdot \frac{1}{x^3}$

## (6) INTERPRETAÇÃO GEOMÉTRICA DA DERIVADA *

(1) $y = x^2$ $(1,1)$ $x_0 = 1$

$y = f(x_0) + f'(x_0)(x - x_0)$
$y = 1 + 2(x-1)$
$y = 1 + 2x - 2$
$y = 2x - 1$

$f(1) = (1)^2 = 1$
$f'(x) = (x^2) = 2x$
↳ $2 \cdot 1 = 2$

(2) $y = x^3$ $(0,0)$ $x_0 = 0$

$y = f(x_0) + f'(x_0)(x - x_0)$
$y = 0 + 0(x-0)$
$y = 0(x)$
$y = 0$

$f(0) = (0)^3 = 0$
$f'(x) = (x^3)' = 3x^2$
↳ $3(0)^2 = 0$

(3) $y = x^2 + \sqrt{7}x + 1$ $(1,6)$ $x_0 = 1$

$y = f(x_0) + f'(x_0)(x - x_0)$
$y = 6 + 6(x-1)$
$y = 6 + 6x - 6$
$y = 6x$

$f(1) = (1)^2 + \sqrt{7} \cdot 1 + 1 = 1 + \sqrt{7} + 1 = 6$
$f'(x) = (x^2 + \sqrt{7}x + 1)' = (x^2)' + (\sqrt{7}x)' + (1)' = 2x + \sqrt{7}$
$2 \cdot 1 + \sqrt{7} = 6$

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4) $y = \frac{1}{x}$ $\left(2, \frac{1}{2}\right)$ $x_0 = 2$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = \frac{1}{2} + \left(\frac{-1}{4}\right)(x - 2)$

$y = \frac{1}{2} + \left(\frac{-1}{4}x + \frac{1}{2}\right)$

$y = \frac{1}{2} - \frac{1}{4}x + \frac{1}{2}$

$y = -\frac{1}{4}x + \frac{2}{2}$

$y = -\frac{1}{4}x + 1$

$f(2) = \frac{1}{2}$

$f'(x) = \left(\frac{1}{x}\right)' = x^{-1} = -x^{-2} = -\frac{1}{x^2}$

$\hookrightarrow -\frac{1}{(2)^2} = -\frac{1}{4}$

5) $y = \sqrt{x}$ $(4, 2)$ $x_0 = 4$ $\sqrt{x} = x^{1/2}$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = 2 + \frac{1}{4}(x - 4)$

$y = 2 + \frac{1}{4}x - 1$

$y = \frac{1}{4}x + 1$

$f(4) = \sqrt{4} = 2$

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

$\hookrightarrow \frac{1}{2\sqrt{4}} = \frac{1}{2 \cdot 2} = \frac{1}{4}$

7,89x + 15,78x - 11,71

15,78x - 7,39

6) $y = e^{2x}$ $(0, 1)$ $x_0 = 0$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = 1 + 2(x - 0)$

$y = 1 + 2x - 0$

$y = 1 + 2x$

$f(0) = e^{2 \cdot 0} = e^0 = 1$

$f'(x) = (e^{2x})' = e^{2x}(2x)' = e^{2x} \cdot 2 = 2e^{2x}$

$2e^{2 \cdot 0} = 2e^0 = 2 \cdot 1 = 2$

7) $y = \ln(1-x^2)$ $(0,0)$ $x_0 = 0$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = 0 + 0(x-0)$

$y = 0 \cdot x$

$y = 0$

$f(0) = \ln(1-(0)^2) = \ln 1 = 0$

$f'(x) = [\ln(1-x^2)]'$

$f'(x) = \frac{(1-x^2)'}{1-x^2}$

$f'(x) = \frac{(1)' - (x^2)'}{1-x^2}$

$f'(x) = \frac{0 - 2x}{1-x^2}$

$f'(x) = \frac{-2x}{1-x^2}$

$\rightarrow f'(x) = \frac{-2 \cdot 0}{1-(0)^2}$

$f'(x) = \frac{0}{1-0}$

$f'(x) = 0$

8) $y = 2^{3x-1}$ $(1,4)$ $x_0 = 1$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = 4 + 12\ln 2(x-1)$

$y = 4 + 12\ln 2(x) - 12\ln 2$

$f(1) = 2^{3\cdot 1 - 1} = 2^{3-1} = 2^2 = 4$

$f'(x) = (2^{3x-1})'$

$f'(x) = 2^{3x-1}\ln 2\,(3x-1)'$

$f'(x) = 2^{3x-1}\ln 2[(3x)' - (1)']$

$f'(x) = 2^{3x-1}\ln 2[3-0]$

$f'(x) = 2^{3x-1}\ln 2 \cdot 3$

$\rightarrow f'(x) = 2^{3\cdot 1 - 1}\ln 2 \cdot 3 = 2^{3-1}\ln 2 \cdot 3 = 2^2 \ln 2 \cdot 3$

$4\ln 2 \cdot 3 = 12\ln 2$

9) $y = x^4 - x^2$ $(1,0)$ $x_0 = 1$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = 0 + 2(x-1)$

$y = 2x - 2$

$f(1) = (1)^4 - (1)^2 = 1 - 1 = 0$

$f'(x) = (x^4 - x^2)' = (x^4)' - (x^2)' = 4x^3 - 2x$

$4(1)^3 - 2\cdot 1 = 4\cdot 1 - 2 = 4 - 2 = 2$

$\sqrt[3]{1-x} = (1-x)^{1/3}$

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**10** $y = \sqrt[3]{1-x}$ $(2, -1)$ $x_0 = 2$

$y = f(x_0) + f'(x_0)(x - x_0)$

$y = -1 + \left(-\frac{1}{3}\right)(x-2)$

$y = -1 - \frac{1}{3}x + \frac{2}{3}$

$y = \frac{-3 - x + 2}{3}$

$y = \frac{-1-x}{3}$

$f(2) = \sqrt[3]{1-2} = \sqrt[3]{-1} = -1$

$f'(x) = [(1-x)^{1/3}]'$

$f'(x) = \frac{1}{3}(1-x)^{-2/3} \cdot (1-x)'$

$f'(x) = \frac{1}{3(1-x)^{2/3}} \cdot (1)' - (x)'$

$f'(x) = \frac{1}{3\sqrt[3]{(1-x)^2}} \quad (0-1)$

$f'(x) = \frac{1}{3\sqrt[3]{(1-x)^2}} \quad (-1)$

$f'(x) = -\frac{1}{3\sqrt[3]{(1-x)^2}}$

$\hookrightarrow f'(x) = -\frac{1}{3\sqrt[3]{(1-2)^2}}$

$f'(x) = \frac{-1}{3\sqrt[3]{(-1)^2}}$

$f'(x) = \frac{-1}{3\sqrt[3]{1}}$

$f'(x) = \frac{-1}{3 \cdot 1}$

$f'(x) = -\frac{1}{3}$