

REVISÃO 2 - PÁGINA 193 DO LIVRO

① $y = 0$

$$y' = (0)'$$
$$y' = 0$$

MATEMÁTICA 1 PARA OS CURSOS DE
ECONOMIA, ADMINISTRAÇÃO E CIÊNCIAS
CONTÁBEIS (MERCINOS, 5ª EDIÇÃO,

② $y = -8$

$$y' = (-8)'$$
$$y' = 0$$

EDITORA ATLAS)

③ $y = \frac{1}{2}$

$$y' = \left(\frac{1}{2}\right)'$$
$$y' = 0$$

④ $y = -\frac{\sqrt{2}}{3}$

$$y' = \left(-\frac{\sqrt{2}}{3}\right)'$$
$$y' = 0$$

⑤ $y = 5x$

$$y' = (5x)'$$
$$y' = 5$$

⑥ $y = -\frac{1}{2}x$

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

⑦ $y = \frac{x}{4}$

$$y' = \left(\frac{x}{4}\right)'$$
$$y' = \frac{1}{4}$$

⑧ $y = -0,1x$

$$y' = (-0,1x)'$$
$$y' = -0,1$$

$$(9) y = \frac{3x}{2}$$

$$y' = \left(\frac{3x}{2} \right)'$$

$$y' = \frac{3}{2}$$

$$(10) y = 2x + 5$$

$$y' = (2x + 5)'$$

$$y' = (2x)' + (5)'$$

$$y' = 2 + 0$$

$$y' = 2$$

$$(11) y = 0,5x^2 - 12x$$

$$y' = (0,5x^2 - 12x)'$$

$$y' = (0,5x^2)' - (12x)'$$

$$y' = 0,5(x^2)' - 12$$

$$y' = 0,5(2x^{2-1}) - 12$$

$$y' = 0,5(2x) - 12$$

$$y' = 1x - 12$$

$$y' = x - 12$$

$$(12) y = 2x^2 + 6x + 1$$

$$y' = (2x^2 + 6x + 1)'$$

$$y' = (2x^2)' + (6x)' + (1)'$$

$$y' = 2(x^2)' + 6 + 0$$

$$y' = 2(2x^{2-1}) + 6$$

$$y' = 2(2x) + 6$$

$$y' = 4x + 6$$

$$(13) y = -\frac{1}{2}x^2 + 5x + 7$$

$$y' = \left(-\frac{1}{2}x^2 + 5x + 7 \right)'$$

$$y' = \left(-\frac{1}{2}x^2 \right)' + (5x)' + (7)'$$

$$y' = -\frac{1}{2}(x^2)' + 5 + 0$$

$$y' = -\frac{1}{2}(2x^{2-1}) + 5$$

$$y' = -\frac{1}{2}(2x) + 5$$

$$y' = -x + 5$$

$$(15) y = \frac{x^2+3}{2}$$

$$y' = \left(\frac{x^2+3}{2} \right)'$$

$$y' = \frac{1}{2}(x^2+3)'$$

$$y' = \frac{1}{2}[(x^2)' + (3)']$$

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

$$y' = \frac{1}{2}(2x)$$

$$y' = x$$

$$(15) y = x^3$$

$$y' = (x^3)'$$

$$y' = 3x^{3-1}$$

$$y' = 3x^2$$

$$(16) y = -\frac{3}{4}x^{20}$$

$$y' = \left(-\frac{3}{4}x^{20} \right)'$$

$$y' = -\frac{3}{4}(x^{20})'$$

$$y' = -\frac{3}{4}(20x^{20-1})$$

$$y' = -\frac{3}{4}(20x^{19})$$

$$y' = -3(5x^{19})$$

$$y' = -15x^{19}$$

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$$(17) y = \frac{x^{10}}{10}$$

$$y' = \left(\frac{x^{10}}{10} \right)'$$

$$y' = \frac{1}{10} (x^{10})'$$

$$y' = \frac{1}{10} (10x^{10-1})$$

$$y' = \frac{1}{10} (10x^9)$$

$$y' = x^9$$

$$(18) y = \frac{x^5}{5}$$

$$y' = \left(\frac{x^5}{5} \right)'$$

$$y' = \frac{1}{5} (x^5)'$$

$$y' = \frac{1}{5} (5x^{5-1})$$

$$y' = \frac{1}{5} (5x^4)$$

$$y' = x^4$$

$$(19) y = -\frac{1}{2}x^3 + \frac{3}{4}x^2 - 5x + 6$$

$$y' = \left(-\frac{1}{2}x^3 + \frac{3}{4}x^2 - 5x + 6 \right)'$$

$$y' = \left(-\frac{1}{2}x^3 \right)' + \left(\frac{3}{4}x^2 \right)' - (5x)' + (6)'$$

$$y' = -\frac{1}{2}(x^3)' + \frac{3}{4}(x^2)' - 5 + 0$$

$$y' = -\frac{1}{2}(3x^{3-1}) + \frac{3}{4}(2x^{2-1}) - 5$$

$$y' = -\frac{1}{2}(3x^2) + \frac{3}{4}(2x) - 5$$

$$y' = -\frac{3x^2}{2} + \frac{3x}{2} - 5$$

$$(20) y = 5 - x^2 + 4x^3$$

$$y' = (5 - x^2 + 4x^3)'$$

$$y' = (5)' - (x^2)' + (4x^3)'$$

$$y' = 0 - (2x^{2-1}) + 4(x^3)'$$

$$y' = -2x + 4(3x^{3-1})$$

$$y' = -2x + 4(3x^2)$$

$$y' = -2x + 12x^2$$

$$(21) y = \sqrt{3}x^3 - x^2 \ln 4 + 10$$

$$y' = (\sqrt{3}x^3 - x^2 \ln 4 + 10)'$$

$$y' = (\sqrt{3}x^3)' - (x^2 \ln 4)' + (10)'$$

$$y' = \sqrt{3}(x^3)' - \ln 4(x^2)' + 0$$

$$y' = \sqrt{3}(3x^{3-1}) - \ln 4(2x^{2-1})$$

$$y' = \sqrt{3}(3x^2) - \ln 4(2x)$$

$$y' = 3x^2\sqrt{3} - 2x \ln 4$$

$$(22) y = x^4 \ln 3 - \frac{x^2}{2} + 1$$

$$y' = (x^4 \ln 3 - \frac{x^2}{2} + 1)'$$

$$y' = (x^4 \ln 3)' - (\frac{x^2}{2})' + (1)'$$

$$y' = \ln 3(x^4)' - \frac{1}{2}(x^2)' + 0$$

$$y' = \ln 3(4x^{4-1}) - \frac{1}{2}(2x^{2-1})$$

$$y' = \ln 3(4x^3) - \frac{1}{2}(2x)$$

$$y' = 4x^3 \ln 3 - x$$

$$(23) y = \frac{4}{3} x^6 - 0,4 x^5 - \frac{1}{10} x^2$$

$$y' = \left(\frac{4}{3} x^6 - 0,4 x^5 - \frac{1}{10} x^2 \right)'$$

$$y' = \left(\frac{4}{3} x^6 \right)' - (0,4 x^5)' - \left(\frac{1}{10} x^2 \right)'$$

$$y' = \frac{4}{3} (x^6)' - 0,4 (x^5)' - \frac{1}{10} (x^2)'$$

$$y' = \frac{4}{3} (6x^{6-1}) - 0,4 (5x^{5-1}) - \frac{1}{10} (2x^{2-1})$$

$$y' = \frac{4}{3} (6x^5) - 0,4 (5x^4) - \frac{1}{10} (2x)$$

$$y' = 8x^5 - 2x^4 - \frac{x}{5}$$

$$(24) y = 3^x$$

$$y' = (3^x)'$$

$$y' = 3^x \ln 3 (x)'$$

$$y' = 3^x \ln 3 \cdot 1$$

$$y' = 3^x \ln 3$$

$$(25) y = \left(\frac{1}{2} \right)^x$$

$$y' = \left[\left(\frac{1}{2} \right)^x \right]'$$

$$y' = \left(\frac{1}{2} \right)^x \ln \frac{1}{2} (x)'$$

$$y' = \left(\frac{1}{2} \right)^x \ln \frac{1}{2} \cdot 1$$

$$y' = \left(\frac{1}{2} \right)^x \ln \frac{1}{2}$$

$$(26) y = (2)^{-x}$$

$$y' = [(2)^{-x}]'$$

$$y' = (2)^{-x} \ln 2 (-x)'$$

$$y' = (2)^{-x} \ln 2 (-1)$$

$$y' = -(2)^{-x} \ln 2$$

$$(2)^{-x} = a^u$$

27 $y = 10^{3-x}$

$10^{3-x} = a^u$

$y' = (10^{3-x})'$

$y' = 10^{3-x} \ln 10 (3-x)'$

$y' = 10^{3-x} \ln 10 [(3)' - (x)']$

$y' = 10^{3-x} \ln 10 [0 - 1]$

$y' = 10^{3-x} \ln 10 (-1)$

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

28 $y = 3^{-0.1x^2}$

$3^{-0.1x^2} = a^u$

$y' = (3^{-0.1x^2})'$

$y' = 3^{-0.1x^2} \ln 3 (-0.1x^2)'$

$y' = 3^{-0.1x^2} \ln 3 (-0.1)(x^2)'$

$y' = 3^{-0.1x^2} \ln 3 (-0.1)(2x^{2-1})$

$y' = 3^{-0.1x^2} \ln 3 (-0.1)(2x)$

$y' = 3^{-0.1x^2} \ln 3 (-0.2x)$

29 $y = e^{2x}$

$e^{2x} = e^u$

$y' = (e^{2x})'$

$y' = e^{2x} (2x)'$

$y' = e^{2x} \cdot 2$

$y' = 2e^{2x}$

30 $y = e^{-x^3}$

$e^{-x^3} = e^u$

$y' = (e^{-x^3})'$

$y' = e^{-x^3} (-x^3)'$

$y' = e^{-x^3} (-3x^{3-1})$

$y' = e^{-x^3} (-3x^2)$

$y' = -3x^2 e^{-x^3}$

31 $y = e^{\ln x}$

$e^{\ln x} = e^u$

$y' = (e^{\ln x})'$

$y' = e^{\ln x} (\ln x)'$

$y' = e^{\ln x} \cdot \frac{1}{x}$

$y' = \frac{e^{\ln x}}{x}$

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$$(32) y = e^{-\frac{1}{2}(x-1)^2}$$

$$e^{-\frac{1}{2}(x-1)^2} = e^u$$

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

$$y' = e^{-\frac{1}{2}(x-1)^2} \left[-\frac{1}{2}(x-1)^2 \right]'$$

$$y' = e^{-\frac{1}{2}(x-1)^2} \left\{ \frac{-1}{2} [(x-1)^2]' \right\}$$

$$y' = e^{-\frac{1}{2}(x-1)^2} \left\{ \frac{-1}{2} [2(x-1)^{2-1}] \right\}$$

$$y' = e^{-\frac{1}{2}(x-1)^2} \left\{ \frac{-1}{2} [2(x-1)] \right\}$$

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

$$(33) y = \ln(x^2 + 3x + 9)$$

$$y' = [\ln(x^2 + 3x + 9)]'$$

$$y' = \frac{(x^2 + 3x + 9)'}{(x^2 + 3x + 9)}$$

$$y' = \frac{(x^2)' + (3x)' + (9)'}{(x^2 + 3x + 9)}$$

$$y' = \frac{(2x^{2-1}) + 3 + 0}{(x^2 + 3x + 9)}$$

$$y' = \frac{2x + 3}{(x^2 + 3x + 9)}$$

$$(34) y = \ln(\sqrt{2}x^2)$$

$$y' = [\ln(\sqrt{2}x^2)]'$$

$$y' = \frac{(\sqrt{2}x^2)'}{\sqrt{2}x^2}$$

$$y' = \frac{\sqrt{2}(x^2)'}{\sqrt{2}x^2}$$

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

$$y' = \frac{\sqrt{2}(2x)}{\sqrt{2}x^2}$$

$$y' = \frac{2x}{x^2}$$

$$y' = \frac{2}{x}$$

$$\sqrt{2}x^2 = u$$

35 $y = \ln\left(\frac{x}{x+1}\right)$

$\frac{x}{x+1} = u$

$y' = \left[\ln\left(\frac{x}{x+1}\right) \right]'$

$y' = \frac{\left(\frac{x}{x+1}\right)'}{\frac{x}{x+1}}$

$y' = \frac{\left(\frac{x}{x+1}\right)' + (1)'}{\frac{x}{x+1} + 1}$

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

$y' = \frac{1(x^{-1})'}{1x^{-1} + 1}$

$y' = \frac{1(-1x^{-1-1})}{1x^{-1} + 1}$

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

$y' = \frac{-1}{x^2 \cdot \frac{x}{x+1}}$

$y' = \frac{-1}{x^2} \cdot \frac{x}{x+1}$

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

36 $y = (x^3 - 2)^5$

$(x^3 - 2)^5 = u^5$

$y' = [(x^3 - 2)^5]'$

$y' = 5(x^3 - 2)^{5-1} \cdot (x^3 - 2)'$

$y' = 5(x^3 - 2)^4 [(x^3)' - (2)']$

$y' = 5(x^3 - 2)^4 [3x^2 - 0]$

$y' = 5(x^3 - 2)^4 [3x^2]$

$y' = 15x^2(x^3 - 2)^4$

37 $y = 5(1-x)^5$

$(1-x)^5 = u^5$

$y' = [5(1-x)^5]'$

$y' = 5[(1-x)^5]'$

$y' = 5[5(1-x)^{5-1} (1-x)']$

$y' = 5[5(1-x)^4 [(1)' - (x)']]$

$y' = 5[5(1-x)^4 [0 - 1]]$

$y' = 5[5(1-x)^4 (-1)]$

$y' = 5[-5(1-x)^4]$

$y' = -25(1-x)^4$

$$(38) y = (5 - x^2)^6$$

$$(5 - x^2)^6 = u^6$$

$$y' = [(5 - x^2)^6]'$$

$$y' = 6(5 - x^2)^{6-1} \cdot (5 - x^2)'$$

$$y' = 6(5 - x^2)^5 [(5)' - (x^2)']$$

$$y' = 6(5 - x^2)^5 [0 - (2x^{2-1})]$$

$$y' = 6(5 - x^2)^5 (-2x)$$

$$y' = -12x(5 - x^2)^5$$

$$(39) y = (x^3 - 10x^4)^3$$

$$(x^3 - 10x^4)^3 = u^3$$

$$y' = [(x^3 - 10x^4)^3]'$$

$$y' = 3(x^3 - 10x^4)^{3-1} (x^3 - 10x^4)'$$

$$y' = 3(x^3 - 10x^4)^2 [(x^3)' - (10x^4)']$$

$$y' = 3(x^3 - 10x^4)^2 [3x^{3-1} - 10(x^4)']$$

$$y' = 3(x^3 - 10x^4)^2 [3x^2 - 10(4x^{4-1})]$$

$$y' = 3(x^3 - 10x^4)^2 [3x^2 - 10(4x^3)]$$

$$y' = 3(x^3 - 10x^4)^2 (3x^2 - 40x^3) = (x^3 - 10x^4)^2 (9x^2 - 120x^3)$$

$$(40) y = -x^2 \ln x$$

$$y' = (-x^2 \ln x)'$$

$$y' = -x^2 (\ln x)' + (-x^2)' \ln x$$

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

$$y' = -x + (-2x) \ln x$$

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

$$(41) y = 4x^3 e^x$$

$$y' = (4x^3 e^x)'$$

$$y' = 4x^3 (e^x)' + (4x^3)' e^x$$

$$y' = 4x^3 e^x + 4(x^3)' e^x$$

$$y' = 4x^3 e^x + 4(3x^{3-1}) e^x$$

$$y' = 4x^3 e^x + 4(3x^2) e^x$$

$$y' = 4x^3 e^x + 12x^2 e^x = 4x^2 e^x (x + 3)$$

$$(42) y = -x^3 e^x$$

$$y' = (-x^3 e^x)'$$

$$y' = -x^3(e^x)' + (-x^3)e^x$$

$$y' = -x^3e^x + (-3x^{3-1})e^x$$

$$y' = -x^3e^x + (-3x^2)e^x$$

$$y' = -x^3e^x - 3x^2e^x = (-x^2e^x)(x+3)$$

$$(43) y = \frac{1}{4} x^5 (1-2x)$$

$$y' = \left[\frac{1}{4} x^5 (1-2x) \right]'$$

$$y' = \frac{1}{4} x^5 (1-2x)' + \left(\frac{1}{4} x^5 \right)' (1-2x)$$

$$y' = \frac{-12x^3}{4} + \frac{5}{4} x^4$$

$$y' = \frac{1}{4} x^5 [(1)' - (2x)'] + \frac{1}{4} (x^5)' (1-2x)$$

$$y' = \frac{1}{4} x^5 (-12x + 5)$$

$$y' = \frac{1}{4} x^5 [0 - 2] + \frac{1}{4} (5x^{5-1}) (1-2x)$$

$$y' = \frac{1}{4} x^5 (-2) + \frac{5}{4} x^4 (1-2x)$$

$$y' = \frac{-2}{4} x^5 + \frac{5}{4} x^4 - \frac{10}{4} x^5$$

$$(44) y = \frac{1}{x}$$

$$y' = \left(\frac{1}{x} \right)'$$

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

$$y' = \frac{0 \cdot x - 1 \cdot 1}{x^2}$$

$$y' = \frac{0 - 1}{x^2}$$

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

$$(45) y = \frac{1}{x}$$

$$y' = \left(\frac{1}{x} \right)'$$

$$y' = \frac{(4)'x - 4(x)'}{x^2}$$

$$y' = \frac{0 \cdot x - 4 \cdot 1}{x^2}$$

$$y' = \frac{0 - 4}{x^2}$$

$$y' = -\frac{4}{x^2}$$

$$(46) \quad y = -\frac{1}{x^2}$$

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

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

$$y' = \frac{0 \cdot x^2 - (-1)(2x^{2-1})}{x^4}$$

$$y' = \frac{0 - (-1)(2x)}{x^4}$$

$$y' = \frac{-(-2x)}{x^4}$$

$$y' = \frac{2x}{x^4}$$

$$y' = \frac{2}{x^3}$$

$$(47) \quad y = \frac{10}{x^2}$$

$$y' = \left(\frac{10}{x^2} \right)'$$

$$y' = \frac{(10)'x^2 - 10(x^2)'}{(x^2)^2}$$

$$y' = \frac{0 \cdot x^2 - 10(2x^{2-1})}{x^4}$$

$$y' = \frac{0 - 10(2x)}{x^4}$$

$$y' = \frac{-20x}{x^4}$$

$$y' = \frac{-20}{x^3}$$

$$(48) y = \frac{1}{x-3}$$

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

$$y' = \frac{(1)'(x-3) - 1(x-3)'}{(x-3)^2}$$

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

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

$$y' = \frac{-1(1)}{(x-3)^2}$$

$$y' = \frac{-1}{(x-3)^2}$$

$$(49) y = 100e^{-x}$$

$$y' = (100e^{-x})'$$

$$y' = (100)'e^{-x} + 100(e^{-x})'$$

$$y' = 0 \cdot e^{-x} + 100e^{-x}(-x)'$$

$$y' = 100e^{-x}(-1)$$

$$y' = -100e^{-x}$$

$$e^{-x} = e^0$$

$$(50) y = \frac{1}{3 \ln x}$$

$$y' = \left(\frac{1}{3 \ln x} \right)'$$

$$y' = \frac{1}{3} \left(\frac{1}{\ln x} \right)'$$

$$y' = \frac{1}{3} \left[\frac{(1)' \ln x - 1(\ln x)'}{(\ln x)^2} \right]$$

$$y' = \frac{1}{3} \left[\frac{0 \cdot \ln x - 1\left(\frac{1}{x}\right)'}{(\ln x)^2} \right]$$

$$y' = \frac{1}{3} \left[\frac{0 - \frac{1}{x^2}}{(\ln x)^2} \right]$$

$$y' = \frac{1}{3} \left[\frac{-\frac{1}{x^2}}{(\ln x)^2} \right]$$

$$y' = \frac{1}{3} \left(-\frac{1}{x} \cdot \frac{1}{(\ln x)^2} \right)$$

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

31 $y = x^2 e^{-x}$

$$e^{-x} = e^{-x}$$

$$y' = (x^2 e^{-x})'$$

$$y' = (x^2)' e^{-x} + x^2 (e^{-x})'$$

$$y' = (2x^{2-1}) e^{-x} + x^2 e^{-x} (-x)'$$

$$y' = 2x e^{-x} + x^2 e^{-x} (-1)$$

$$y' = 2x e^{-x} - x^2 e^{-x} = e^{-x} (2x - x^2)$$

32 $y = \frac{4x}{x-1}$

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

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

$$y' = \frac{4(x-1) - 4x[(x)' - (1)']}{(x-1)^2}$$

$$y' = \frac{4x - 4 - 4x[1 - 0]}{(x-1)^2}$$

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

$$y' = \frac{4x - 4 - 4x}{(x-1)^2} \Rightarrow y' = \frac{-4}{(x-1)^2}$$

33

$$y = \frac{x}{1-x} \quad y' = \left(\frac{x}{1-x} \right)'$$

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

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

$$y' = \frac{1-x - x[0-1]}{(1-x)^2}$$

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

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

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

34

$$y = \frac{x}{e^x} \quad y' = \left(\frac{x}{e^x} \right)'$$

$$y' = \frac{(x)'e^x - x(e^x)'}{(e^x)^2}$$

$$y' = \frac{1e^x - xe^x}{(e^x)^2}$$

$$y' = \frac{e^x - xe^x}{(e^x)^2}$$

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

$$y' = \frac{1-x}{e^x}$$

35

$$y = \frac{x}{\ln x} \quad y' = \left(\frac{x}{\ln x} \right)'$$

$$y' = \frac{(x)' \ln x - x (\ln x)'}{(\ln x)^2}$$

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

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

$$\textcircled{36} y = \frac{1-x^2}{1+x^2}$$

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

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

$$y' = \frac{[(1)' - (x^2)'] (1+x^2) - (1-x^2) [(1)' + (x^2)']}{(1+x^2)^2}$$

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

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

$$y' = \frac{-2x - 2x^3 - (2x - 2x^3)}{(1+x^2)^2}$$

$$y' = \frac{-2x - 2x^3 - 2x + 2x^3}{(1+x^2)^2}$$

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

$$\textcircled{37} y = \frac{x+\sqrt{2}}{x-\sqrt{3}}$$

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

$$y' = \frac{(x+\sqrt{2})'(x-\sqrt{3}) - (x+\sqrt{2})(x-\sqrt{3})'}{(x-\sqrt{3})^2}$$

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

$$y' = \frac{(1+0)(x-\sqrt{3}) - (x+\sqrt{2})(1-0)}{(x-\sqrt{3})^2}$$

$$y' = \frac{(1)(x-\sqrt{3}) - (x+\sqrt{2})(1)}{(x-\sqrt{3})^2}$$

$$y' = \frac{x-\sqrt{3} - x-\sqrt{2}}{(x-\sqrt{3})^2}$$

$$y' = \frac{-\sqrt{3}-\sqrt{2}}{(x-\sqrt{3})^2}$$

$$(58) \quad y = \frac{2-x^2}{5-x+x^2}$$

$$y' = \left(\frac{2-x^2}{5-x+x^2} \right)'$$

$$y' = \frac{(2-x^2)'(5-x+x^2) - (2-x^2)(5-x+x^2)'}{(5-x+x^2)^2}$$

$$y' = \frac{[(2)' - (x^2)'](5-x+x^2) - (2-x^2)[(5)' - (x)' + (x^2)']}{(5-x+x^2)^2}$$

$$y' = \frac{[0 - (2x^{2-1})](5-x+x^2) - (2-x^2)[0 - 1 + (2x^{2-1})]}{(5-x+x^2)^2}$$

$$y' = \frac{(-2x)(5-x+x^2) - (2-x^2)(-1+2x)}{(5-x+x^2)^2}$$

$$y' = \frac{-8x + 2x^2 - 2x^3 - (-2 + 1x + x^2 - 2x^3)}{(5-x+x^2)^2}$$

$$y' = \frac{-8x + 2x^2 - 2x^3 + 2 - 1x - x^2 + 2x^3}{(5-x+x^2)^2}$$

$$y' = \frac{-12x + x^2 + 2}{(5-x+x^2)^2}$$

$$(59) \quad y = \frac{x^2}{1-x^3}$$

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

$$y' = \frac{(x^2)'(1-x^3) - x^2(1-x^3)'}{(1-x^3)^2}$$

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

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

$$y' = \frac{2x - 2x^4 - x^2(-3x^2)}{(1-x^3)^2}$$

$$y' = \frac{2x - 2x^4 + 3x^4}{(1-x^3)^2}$$

$$y' = \frac{2x + x^4}{(1-x^3)^2}$$

$$(60) y = e^{-x} \ln x$$

$$y' = (e^{-x} \ln x)'$$

$$y' = (e^{-x})' \ln x + e^{-x} (\ln x)'$$

$$y' = e^{-x} (-x)' \ln x + e^{-x} \cdot \frac{1}{x}$$

$$e^{-x} = e^0$$

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

$$y' = -e^{-x} \ln x + \frac{e^{-x}}{x} = e^{-x} \left(-\ln x + \frac{1}{x} \right)$$

$$(61) y = \frac{e^{x^2}}{x}$$

$$y' = \left(\frac{e^{x^2}}{x} \right)'$$

$$y' = \frac{(e^{x^2})' x - e^{x^2} (x)'}{x^2}$$

$$y' = \frac{e^{x^2} (x^2)' x - e^{x^2} \cdot 1}{x^2}$$

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

$$y' = \frac{e^{x^2} (2x) x - e^{x^2}}{x^2}$$

$$y' = \frac{e^{x^2} 2x^2 - e^{x^2}}{x^2}$$

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

62 $y = x^2 e^{x^2-1}$

$$e^{x^2-1} = e^0$$

$$y' = (x^2 e^{x^2-1})'$$

$$y' = (x^2)' e^{x^2-1} + x^2 (e^{x^2-1})'$$

$$y' = (2x^{2-1}) e^{x^2-1} + x^2 e^{x^2-1} (x^{2-1})'$$

$$y' = 2x e^{x^2-1} + x^2 e^{x^2-1} [(x^2)' - (1)']$$

$$y' = 2x e^{x^2-1} + x^2 e^{x^2-1} [(2x^{2-1}) - 0]$$

$$y' = 2x e^{x^2-1} + x^2 e^{x^2-1} (2x)$$

$$y' = 2x e^{x^2-1} + 2x^3 e^{x^2-1}$$

$$y' = 2x e^{x^2-1} (1 + x^2)$$

63 $y = -x^2 3^{-x}$

$$3^{-x} = a^u$$

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

$$y' = (-x^2)' 3^{-x} + (-x^2) (3^{-x})'$$

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

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

$$y' = -2x \cdot 3^{-x} + (-x^2) (-3^{-x} \ln 3)$$

$$y' = -2x \cdot 3^{-x} + x^2 \cdot 3^{-x} \ln 3$$

$$y' = 3^{-x} \cdot x (-2 + x \ln 3)$$

64 $y = (\ln x)^4$

$$(\ln x)^4 = u^4$$

$$y' = [(\ln x)^4]'$$

$$y' = 4(\ln x)^{4-1} (\ln x)'$$

$$y' = 4(\ln x)^3 \cdot \frac{1}{x}$$

$$y' = \frac{4(\ln x)^3}{x}$$

65 $y = \frac{1}{4} (e^x)^4$

$$y' = \left(\frac{1}{4} (e^x)^4 \right)'$$

$$(e^x)^3 = u^a$$

$$y' = \frac{1}{1} [(e^x)^3]'$$

$$y' = \frac{1}{1} [3(e^x)^{3-1} (e^x)']$$

$$y' = \frac{1}{1} [3(e^x)^2 e^x]$$

$$y' = \frac{3(e^x)^2 e^x}{1}$$

$$y' = \frac{3(e^x)^3}{1}$$

$$(66) y = -x^3 e^x$$

$$y' = (-x^3 e^x)'$$

$$y' = (-x^3)' e^x + (-x^3) (e^x)'$$

$$y' = (-3x^{3-1}) e^x + (-x^3) e^x$$

$$y' = -3x^2 e^x - x^3 e^x$$

$$y' = x^2 e^x (-3 - x)$$

$$(67) y = x(1-2x)^6$$

$$y' = [x(1-2x)^6]'$$

$$y' = (x)' (1-2x)^6 + x [(1-2x)^6]'$$

$$y' = 1(1-2x)^6 + x [6(1-2x)^{6-1} (1-2x)']$$

$$y' = (1-2x)^6 + x \{ 6(1-2x)^5 [(1)' - (2x)'] \}$$

$$y' = (1-2x)^6 + x \{ 6(1-2x)^5 [0 - 2] \}$$

$$y' = (1-2x)^6 + x [6(1-2x)^5 (-2)]$$

$$y' = (1-2x)^6 + x [-12(1-2x)^5]$$

$$y' = (1-2x)^6 - 12x(1-2x)^5$$

$$y' = (1-2x)^5 [(1-2x) - 12x]$$

$$y' = (1-2x)^5 [1-2x-12x]$$

$$y' = (1-2x)^5 (1-14x)$$

$$(68) y = (x \ln x)^2$$

$$y' = [(x \ln x)^2]'$$

$$(x \ln x)^2 = u^2$$

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

$$y' = 2(x \ln x) \cdot [(x)' \ln x + x (\ln x)']$$

$$y' = 2x \ln x \left[1 \ln x + x \left(\frac{1}{x} \right) \right]$$

$$y' = 2x \ln x (\ln x + 1)$$

$$(69) y = \sqrt{x^2 + 6x + 1}$$

$$y = (x^2 + 6x + 1)^{0.5}$$

$$(x^2 + 6x + 1)^{0.5} = u^{0.5}$$

$$y' = [(x^2 + 6x + 1)^{0.5}]'$$

$$y' = 0.5(x^2 + 6x + 1)^{0.5-1} (x^2 + 6x + 1)'$$

$$y' = 0.5(x^2 + 6x + 1)^{-0.5} [(x^2)' + (6x)' + (1)']$$

$$y' = \frac{0.5}{(x^2 + 6x + 1)^{0.5}} [(2x^1)' + 6 + 0]$$

$$y' = \frac{0.5}{\sqrt{x^2 + 6x + 1}} (2x + 6)$$

$$y' = \frac{x + 3}{\sqrt{x^2 + 6x + 1}}$$

$$(70) y = 10(1 + 2x)^{0.25}$$

$$(1 + 2x)^{0.25} = u^{0.25}$$

$$y' = [10(1 + 2x)^{0.25}]'$$

$$y' = 10[(1 + 2x)^{0.25}]'$$

$$y' = 10[0.25(1 + 2x)^{0.25-1} (1 + 2x)']$$

$$y' = 10 \left\{ 0.25(1 + 2x)^{-0.75} [(1)' + (2x)'] \right\}$$

$$y' = 10 \left\{ \frac{0.25}{(1 + 2x)^{0.75}} [0 + 2] \right\}$$

$$y' = 10 \left[\frac{0.25}{(1 + 2x)^{0.75}} (2) \right]$$

$$y' = 10 \left(\frac{0.5}{(1 + 2x)^{0.75}} \right)$$

$$y' = \frac{5}{(1 + 2x)^{0.75}}$$

$$71) y = \sqrt[3]{2x+1}$$

$$y = (2x+1)^{1/3}$$

$$(2x+1)^{1/3} = u^a$$

$$y' = [(2x+1)^{1/3}]'$$

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

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

$$y' = \left\{ \frac{1}{3} (2x+1)^{-\frac{2}{3}} [2+0] \right\}$$

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

$$y' = \frac{2}{3} (2x+1)^{-\frac{2}{3}}$$

$$72) y = \ln(\sqrt{6x+4})$$

$$y = \ln(6x+4)^{1/2}$$

$$\ln(6x+4)^{1/2} = \ln u$$

$$(6x+4)^{1/2} = u^a$$

$$y' = [\ln(6x+4)^{1/2}]'$$

$$y' = \frac{[(6x+4)^{1/2}]'}{(6x+4)^{1/2}}$$

$$y' = \frac{[(6x+4)^{0,5}]'}{(6x+4)^{0,5}}$$

$$y' = \frac{[0,5(6x+4)^{0,5-1} (6x+4)']}{(6x+4)^{0,5}}$$

$$y' = \left\{ \frac{0,5(6x+4)^{-0,5} [(6x)' + (4)']}{(6x+4)^{0,5}} \right\}$$

$$y' = \left\{ \frac{0,5(6x+4)^{-0,5} [6+0]}{(6x+4)^{0,5}} \right\}$$

$$y' = \frac{[0,5(6x+4)^{-0,5} (6)]}{(6x+4)^{0,5}}$$

$$y' = \frac{3(6x+4)^{-0,5}}{(6x+4)^{0,5}}$$

$$y' = \frac{3}{(6x+4)^{0,5} \cdot (6x+4)^{0,5}}$$

$$y' = \frac{3}{6x+4}$$

$$(73) y = e^{1/x}$$

$$e^{1/x} = e^u$$

$$y' = (e^{1/x})'$$

$$y' = e^{1/x} \left(\frac{1}{x} \right)'$$

$$y' = e^{1/x} \left[\frac{(1)'x - 1(x)'}{x^2} \right]$$

$$y' = e^{1/x} \left[\frac{0 \cdot x - 1(1)}{x^2} \right]$$

$$y' = e^{1/x} \left(\frac{0 - 1}{x^2} \right)$$

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

$$y' = -\frac{e^{1/x}}{x^2}$$

$$(74) y = e^{x^2+2x+1}$$

$$e^{x^2+2x+1} = e^u$$

$$y' = (e^{x^2+2x+1})'$$

$$y' = e^{x^2+2x+1} (x^2+2x+1)'$$

$$y' = e^{x^2+2x+1} [(x^2)' + (2x)' + (1)']$$

$$y' = e^{x^2+2x+1} [2x^2 + 2 + 0]$$

$$y' = e^{x^2+2x+1} (2x+2)$$

$$(75) y = x^2 + 10x - \frac{5}{x}$$

$$y' = \left(x^2 + 10x - \frac{5}{x} \right)'$$

$$y' = (x^2)' + (10x)' - \left(\frac{5}{x} \right)'$$

$$y' = (2x^2 + 10) - \left[\frac{(5)'x - 5(x)'}{x^2} \right]$$

$$y' = 2x + 10 - \left[\frac{0 \cdot x - 5 \cdot 1}{x^2} \right]$$

$$y' = 2x + 10 - \left(-\frac{5}{x^2} \right) = 2x + 10 + \frac{5}{x^2}$$

76 $y = 0,5 e^x \ln x$

$$y' = (0,5 e^x \ln x)'$$

$$y' = 0,5 (e^x \ln x)'$$

$$y' = 0,5 [(e^x)' \ln x + e^x (\ln x)']$$

$$y' = 0,5 \left(e^x \ln x + e^x \frac{1}{x} \right)$$

$$y' = 0,5 \left(e^x \ln x + \frac{e^x}{x} \right)$$

$$y' = 0,5 e^x \left(\ln x + \frac{1}{x} \right)$$

77 $y = 3(x+1)^6$

$$y' = [3(x+1)^6]'$$

$$y' = 3[(x+1)^6]'$$

$$y' = 3[6(x+1)^{6-1} (x+1)']$$

$$y' = 3[6(x+1)^5 [(x)'+(1)']]$$

$$y' = 3[6(x+1)^5 [1+0]]$$

$$y' = 3[6(x+1)^5 (1)]$$

$$y' = 3[6(x+1)^5]$$

$$y' = 30(x+1)^5$$

78 $y = e^{\sqrt{x}} (3x^2 - 20)$

$$e^{\sqrt{x}} = e^u$$

$$y' = [e^{\sqrt{x}} (3x^2 - 20)]'$$

$$y' = (e^{\sqrt{x}})' (3x^2 - 20) + e^{\sqrt{x}} (3x^2 - 20)'$$

$$y' = e^{\sqrt{x}} (\sqrt{x})' (3x^2 - 20) + e^{\sqrt{x}} [(3x^2)' - (20)']$$

$$y' = e^{\sqrt{x}} 0 (3x^2 - 20) + e^{\sqrt{x}} [3(2x) - 0]$$

$$y' = 0 + e^{\sqrt{x}} [3(2x)]$$

$$y' = e^{\sqrt{x}} (3 \cdot 2x)$$

$$y' = 6x e^{\sqrt{x}}$$

79 $y = (\sqrt{3x^2 - 1})^3$

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

$$y' = (3x^2 - 1)^{\frac{3}{2}-1}$$

$$(3x^2 - 1)^{\frac{1}{2}} = u$$

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

$$y' = \left[\frac{3}{2} (3x^2 - 1)^{\frac{3}{2}-1} (3x^2 - 1)' \right]$$

$$y' = \left\{ \frac{3}{2} (3x^2 - 1)^{\frac{3}{2}} [(3x^2)' - (1)'] \right\}$$

$$y' = \left\{ \frac{3}{2} (3x^2 - 1)^{\frac{3}{2}} [3(2x)' - 0] \right\}$$

$$y' = \left\{ \frac{3}{2} (3x^2 - 1)^{\frac{3}{2}} [3(2x^2)'] \right\}$$

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

$$y' = \left\{ \frac{3}{2} (3x^2 - 1)^{\frac{3}{2}} \cdot 6x \right\}$$

$$y' = 15x (3x^2 - 1)^{\frac{3}{2}}$$

80 $y = \frac{x\sqrt{x} - 50}{\ln 20}$

$$x\sqrt{x} = x \cdot x^{\frac{1}{2}} = x^{\frac{3}{2}}$$

$$y = \frac{x^{\frac{3}{2}} - 50}{\ln 20}$$

$$y' = \left(\frac{x^{\frac{3}{2}} - 50}{\ln 20} \right)'$$

$$y' = \frac{(x^{\frac{3}{2}} - 50)' \ln 20 - (x^{\frac{3}{2}} - 50)(\ln 20)'}{(\ln 20)^2}$$

$$y' = \frac{[(x^{\frac{3}{2}})' - (50)'] \ln 20 - (x^{\frac{3}{2}} - 50) \cdot 0}{(\ln 20)^2}$$

$$y' = \frac{\left[\frac{3}{2} x^{\frac{3}{2}-1} - 0 \right] \ln 20 - 0}{(\ln 20)^2}$$

$$y' = \frac{\left(\frac{3}{2} x^{\frac{1}{2}} \right) \ln 20}{(\ln 20)^2}$$

$$y' = \frac{\frac{3}{2} \sqrt{x}}{\ln 20}$$

$$y' = \frac{3\sqrt{x}}{2} \cdot \frac{1}{\ln 20} \Rightarrow y' = \frac{3\sqrt{x}}{2\ln 20}$$