



Calcular as três primeiras derivadas de cada uma das funções seguintes:

1.  $y = k$  (constante)

11.  $y = (x + 1)^4$

2.  $y = x$

12.  $y = x \ln x$

3.  $y = x^5$

13.  $y = e^{-x^2}$

4.  $y = x^4 - 3x^3 + 2x + 1$

14.  $y = 0,4x^{0,1}$

5.  $y = \frac{2}{x}$

15.  $y = (1 - x)^3$

6.  $y = \sqrt{5x}$

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

7.  $y = \sqrt[3]{2x}$

17.  $y = e^{\frac{1}{x}}$

8.  $y = e^{-x}$

18.  $y = x e^{-2x}$

9.  $y = \ln x$

19.  $y = 1 - x^3$

10.  $y = 3^{2x}$

20.  $y = \log(-x)$

RESPOSTAS:

1.  $y' = 0$ ;  $y'' = 0$ ;  $y''' = 0$

2.  $y' = 1$ ;  $y'' = 0$ ;  $y''' = 0$

3.  $y' = 5x^4$ ;  $y'' = 20x^3$ ;  $y''' = 60x^2$

4.  $y' = 4x^3 - 9x^2 + 2$ ;  $y'' = 12x^2 - 18x$ ;  $y''' = 24x - 18$

5.  $y' = -\frac{2}{x^2}$ ;  $y'' = \frac{4}{x^3}$ ;  $y''' = -\frac{12}{x^4}$

6.  $y' = \frac{5}{2\sqrt{5x}}$ ;  $y'' = -\frac{25}{4(\sqrt{5x})^3}$ ;  $y''' = \frac{375}{8(\sqrt{5x})^5}$

7.  $y' = \frac{2}{3} \frac{1}{(\sqrt[3]{2x})^2}$ ;  $y'' = -\frac{8}{9} \frac{1}{(\sqrt[3]{2x})^5}$ ;  $y''' = \frac{80}{27} \frac{1}{(\sqrt[3]{2x})^8}$

8.  $y' = -e^{-x}$ ;  $y'' = e^{-x}$ ;  $y''' = -e^{-x}$

9.  $y' = \frac{1}{x}$ ;  $y'' = -\frac{1}{x^2}$ ;  $y''' = \frac{2}{x^3}$

10.  $y' = (2 \ln 3) 3^{2x}$ ;  $y'' = (2 \ln 3)^2 3^{2x}$ ;  $y''' = (2 \ln 3)^3 3^{2x}$

11.  $y' = 4(x + 1)^3$ ;  $y'' = 12(x + 1)^2$ ;  $y''' = 24(x + 1)$

12.  $y' = 1 + \ln x$ ;  $y'' = \frac{1}{x}$ ;  $y''' = -\frac{1}{x^2}$

13.  $y' = -2x e^{-x^2}$ ;  $y'' = e^{-x^2}(4x^2 - 2)$ ;  $y''' = e^{-x^2}(-8x^3 + 12x)$

14.  $y' = 0,04 x^{-0,9}$ ;  $y'' = -0,036 x^{-1,9}$ ;  $y''' = 0,0684 x^{-2,9}$

15.  $y' = -3(1 - x)^2$ ;  $y'' = 6(1 - x)$ ;  $y''' = -6$

16.  $y' = x^{-3}$ ;  $y'' = -3x^{-4}$ ;  $y''' = 12x^{-5}$

17.  $y' = -\frac{1}{x^2} e^{\frac{1}{x}}$ ;  $y'' = e^{\frac{1}{x}}(2x^{-3} + x^{-4})$ ;  $y''' = e^{\frac{1}{x}}(-6x^{-4} - 6x^{-5} - x^{-6})$

18.  $y' = e^{2x}(1 - 2x)$ ;  $y'' = e^{2x}(4x - 4)$ ;  $y''' = e^{2x}(-8x + 12)$

19.  $y' = -3x^2$ ;  $y'' = -6x$ ;  $y''' = -6$

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