

Halla las derivadas de las siguientes funciones:

$$a(x) = 2x^2 + 4x + 6$$

$$b(x) = x^3 + 5x^2 - 7x + 1$$

$$c(x) = 5x^4 - 7x^3 + 6x^2 - 7$$

**Solución**

$$a'(x) = 4x + 4$$

$$b'(x) = 3x^2 + 10x - 7$$

$$c'(x) = 20x^3 - 21x^2 + 12x$$

**Ejercicio nº11**

Halla las derivadas de las siguientes funciones:

$$a(x) = L\left(\frac{x}{x-1}\right)$$

$$b(x) = L\left(\frac{x-1}{x+1}\right)$$

$$c(x) = \log(x^2)$$

$$d(x) = \log_2(5x^2)$$

**Solución**

$$a(x) = L\left(\frac{x}{x-1}\right) = L(x) - L(x-1) \Rightarrow a'(x) = \frac{1}{x} - \frac{1}{x-1} = -\frac{1}{x(x-1)}$$

$$b(x) = L\left(\frac{x-1}{x+1}\right) = L(x-1) - L(x+1) \Rightarrow b'(x) = \frac{1}{x-1} - \frac{1}{x+1} = \frac{2}{(x-1)(x+1)}$$

$$c(x) = \log(x^2) = \frac{L(x^2)}{L(10)} = \frac{2}{L(10)} \cdot L(x) \Rightarrow c'(x) = \frac{2}{x \cdot L(10)}$$

$$d(x) = \log_2(5x^2) = \frac{L(5x^2)}{L(2)} = \frac{L5}{L2} + \frac{2}{L2} \cdot L(x) \Rightarrow d'(x) = \frac{2}{x \cdot L2}$$

Halla la derivada de las funciones:

$$a) \frac{1}{x} - \frac{1}{x^2} - \frac{1}{x^3}$$

$$b) \frac{-2}{x+1} - \frac{3}{(x+1)^2} + \frac{4}{(x+1)^3}$$

**Solución**

$$a) D\left(\frac{1}{x} - \frac{1}{x^2} - \frac{1}{x^3}\right) = -\frac{1}{x^2} + \frac{2}{x^3} + \frac{3}{x^4}$$

$$b) D\left(\frac{-2}{x+1} - \frac{3}{(x+1)^2} + \frac{4}{(x+1)^3}\right) = \frac{2}{(x+1)^2} + \frac{6}{(x+1)^3} - \frac{12}{(x+1)^4}$$

Halla las funciones derivadas (y calcula sus valores en  $x = 0$  y  $x = -1$ ) de las funciones:

$$a(x) = \frac{3x^2 + 6x}{5x + 1}$$

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

**Solución**

$$a'(x) = D\left(\frac{3x^2 + 6x}{5x + 1}\right) = \frac{(6x+6)(5x+1) - 5(3x^2+6x)}{(5x+1)^2} = \frac{3(5x^2+2x+2)}{(5x+1)^2} \Rightarrow \begin{cases} a'(0) = 6 \\ a'(-1) = \frac{15}{16} \end{cases}$$

$$b'(x) = D\left(\frac{(3x-1)(2x^2+4)}{(x-1)^2}\right) = D\left(\frac{6x^3-2x^2+12x-4}{(x-1)^2}\right) = \frac{2(3x^3-9x^2-4x-2)}{(x-1)^3} \Rightarrow \begin{cases} b'(0) = 4 \\ b'(-1) = \frac{5}{2} \end{cases}$$

Calcula las derivadas de las funciones:

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

$$b(x) = \frac{1}{x} + 2L(x) - \frac{L(x)}{x}$$

$$c(x) = L\left(\frac{x+3}{2x+1}\right)$$

**Solución**

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

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

$$c(x) = L\left(\frac{x+3}{2x+1}\right) = L(x+3) - L(2x+1) \Rightarrow c'(x) = \frac{1}{x+3} - \frac{2}{2x+1} = -\frac{5}{(x+3)(2x+1)}$$

Halla las derivadas de las funciones:

$$a(x) = \frac{3x^2 \sqrt[4]{x} - 2x\sqrt{x}}{5\sqrt[4]{x}}$$

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

**Solución**

- Pasando a forma potencial se tiene:

$$a(x) = \frac{3x^2 \sqrt[4]{x} - 2x\sqrt{x}}{5\sqrt[4]{x}} = \frac{3}{5}x^2 - \frac{2}{5}x^{\frac{5}{4}}$$

$$a'(x) = \frac{6}{5}x - \frac{1}{2}x^{\frac{1}{4}} = \frac{6}{5}x - \frac{1}{2}\sqrt[4]{x}$$

- Pasando a forma potencial se tiene:

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

$$b'(x) = -3x^{-4} - (x+1)^{-\frac{3}{2}} - \frac{1}{3}(x-1)^{-\frac{2}{3}} = -\frac{3}{x^4} - \frac{1}{(x+1)\sqrt{x+1}} - \frac{1}{3\sqrt[3]{(x-1)^2}}$$