16/03/10

Hallar la derivada de las siguientes funciones:

(182) 1° $f(x) = 3x^2 - 6x + 5$ (*)

5) $(f \pm g)' = f' \pm g'$

(*) $f'(x) = (3x^2)' - (6x)' + 5' = 3(x^2)' - 6x' + 0$

$= 3 \cdot 2x - 6 = 6x - 6$

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

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

$= \frac{1}{2\sqrt{x}} + \frac{1}{3\sqrt[3]{x^2}}$

(182)

3° $f(x) = \sqrt{2x} + \sqrt[3]{5x} = \sqrt{2} \cdot x^{1/2} + \sqrt[3]{5} \cdot x^{1/3}$

$f'(x) = \sqrt{2} \cdot \frac{1}{2} x^{-1/2} + \sqrt[3]{5} \cdot \frac{1}{3} x^{-2/3} =$

$= \frac{\sqrt{2}}{2} \frac{1}{\sqrt{x}} + \frac{\sqrt[3]{5}}{3} \cdot \frac{1}{\sqrt[3]{x^2}}$

4° $f(x) = \frac{1}{x\sqrt{x}} = \frac{1}{x \cdot x^{1/2}} = \frac{1}{x^{3/2}} = x^{-3/2}$

$f'(x) = -\frac{3}{2} x^{-3/2-1} = -\frac{3}{2} x^{-5/2} =$

$= \frac{-3}{2\sqrt{x^5}}$

(19) 15° 16° 17° CASA

17/03/10 Halla f' y calcula su valor

15° $f(x) = 2x^3 + 3x^2 - 6 \quad x = 1$

$f'(x) = 2 \cdot 3x^2 + 3 \cdot 2x$; $f'(1) = 6 \cdot 1^2 + 6 \cdot 1 = 12$

$= 6x^2 + 6x$

$f(x) = k \to f'(x) = 0$

$f(x) = x \to f'(x) = 1$

$f(x) = x^n \to f'(x) = n x^{n-1}$

$y = k f(x) \to y' = k f'(x)$

$(f \pm g)' = f' \pm g'$

16° $f(x) = \frac{x}{3} + \sqrt{2}$; $x = -17/3$

$f'(x) = \frac{1}{3} \cdot 1 + 0 = \frac{1}{3}$ $\rightarrow$ $f'(-17/3) = \frac{1}{3}$

17° $f(x) = \frac{x^3}{2} + \frac{3}{2}x^2 - \frac{x}{2}$; $x = 2$

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

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

$f'(2) = \frac{3}{2} \cdot 2^2 + 3 \cdot 2 - \frac{1}{2} = 6 + 6 - \frac{1}{2} = 12 - \frac{1}{2} = \frac{23}{2}$

Derivada de um cociente

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

(195) 18° $f(x) = \frac{1}{7x+1}$; $x = 0$

$f'(x) = \frac{0 \cdot (7x+1) - 7 \cdot 1}{(7x+1)^2} = \frac{-7}{(7x+1)^2}$

$f'(0) = \frac{-7}{1} = -7$

(19°) $f(x) = \frac{2x}{x+3}$; $x = -1$

$$f'(x) = \frac{2(x+3) - 1 \cdot 2x}{(x+3)^2} = \frac{2x+6-2x}{(x+3)^2} = \boxed{\frac{6}{(x+3)^2}}$$

$$f'(-1) = \frac{6}{(-1+3)^2} = \frac{6}{2^2} = \frac{6}{4} = \boxed{\frac{3}{2}}$$

(25°) $f(x) = \frac{x+5}{x-5}$; $x = 3$

$$f'(x) = \frac{1 \cdot (x-5) - 1(x+5)}{(x-5)^2} = \frac{x-5-x-5}{(x-5)^2} = \boxed{\frac{-10}{(x-5)^2}}$$

$$f'(3) = \frac{-10}{(3-5)^2} = \frac{-10}{(-2)^2} = \frac{-10}{4} = \boxed{-\frac{5}{2}}$$

(195) (38°) Halla los puntos en los que la derivada es igual a 0 de las funciones:

a) $y = 3x^2 - 2x + 1$ // b) $y = x^3 - 3x$

CASA

18/02/10

a) $y' = 6x - 2 = 0$

$6x = 2$; $x = \frac{2}{6} = 1/3$

b) $y' = 3x^2 - 3 = 0$

$3x^2 = 3$; $x^2 = \frac{3}{3} = 1$

$x = \pm\sqrt{1} = \pm 1$

(195) (39°) Obtené los puntos en los que $f'(x) = 1$ en los siguientes casos:

a) $f(x) = x^2 - 3x + 2$

b) $f(x) = \dfrac{x+1}{x+5}$

a) $f'(x) = 2x - 3 = 1$

$2x = 1 + 3 = 4$

$\boxed{x = 2}$

b) $f'(x) = \dfrac{1\cdot(x+5) - 1\cdot(x+1)}{(x+5)^2}$

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

$4 = (x+5)^2 \; ; \; 4 = x^2 + 10x + 25$

$x^2 + 10x + 21 = 0$

$x = \dfrac{-10 \pm \sqrt{100 - 84}}{2} = \dfrac{-10 \pm 4}{2}$ → -7, -3

Más reglas de derivación

$$(f \cdot g)' = f' \cdot g + f \cdot g'$$

$$(f^n)' = n f' \cdot f^{n-1}$$

(195) (28) Deriva a) $f(x) = \dfrac{x}{3} + \sqrt{2x} = \dfrac{1}{3}x + (2x)^{1/2}$

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

b) $f(x) = (x^2-3)^3$

$f'(x) = 3 \cdot 2x (x^2-3)^2 = 6x(x^2-3)^2$ $\quad x \neq 0$

29° a) $f(x) = \dfrac{x^3 - x^2}{x^2} = \dfrac{x^2(x-1)}{x^2} = x-1$

$f'(x) = \dfrac{(3x^2-2x)x^2 - 2x(x^3-x^2)}{x^4} = \dfrac{3x^4 - 2x^3 - 2x^4 + 2x^3}{x^4} =$

$f'(x) = \dfrac{x^4}{x^4} = 1$

b) $f(x) = \sqrt{x^2+1} = (x^2+1)^{1/2}$

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

Más reglas de derivación

$y = \ln x \Rightarrow y' = \dfrac{1}{x} \quad // \quad (\ln f)' = \dfrac{f'}{f}$

$y = e^x \Rightarrow y' = e^x \quad // \quad (e^f)' = f' e^f$

(19 J) **20°** $f(x) = \ln(3x-1)$; $x = 3$

$f'(x) = \dfrac{3}{3x-1}$; $f'(3) = \dfrac{3}{9-1} = \dfrac{3}{8}$

23° CASA.