19 03 2025.

Derivada es un cambio.

Siempre la derivada de una constante es 0

- Regla de la potencia

Si $f(x) = x^n$, entonces $f'(x) = n \cdot x^{n-1}$

Ejm 1 = Deriva $f(x) = x^5$
$f'(x) = 5x^4$

Ejm 2 = Deriva $f(x) = 3x^7$
$f'(x) = 21x^6$

- Regla de la constante

Si $f(x) = c$, donde c es una constante, entonces $f'(x) = 0$

Ejm 1 = Deriva $f(x) = 7$
$f'(x) = 0$

Ejm 2 = Deriva $f(x) = -3$
$f'(x) = 0$

- Regla de la suma

Si $f(x) = g(x) + h(x)$, entonces $f'(x) = g'(x) + h'(x)$

Ejm 1 = Deriva $f(x) = x^2 + 5x$
$f'(x) = 2x + 5$

Ejm 2 = Deriva $f(x) = 4x^3 + x^2$
$f'(x) = 12x^2 + 2x$

- Regla del producto

Si $f(x) = g(x) \cdot h(x)$; entonces $f'(x) = g'(x) \cdot h(x) + g(x) \cdot h'(x)$

Ejm 1 = Deriva $f(x) = x^2 \cdot \sin(x)$
$f'(x) = 2x \cdot \sin(x) + x^2 \cdot \cos(x)$

Ejm 2 = Deriva $f(x) = (2x+1) \cdot e^x$
$f'(x) = 2 \cdot e^x + (2x+1) \cdot e^x$
$f'(x) = 2e^x + 2xe^x + 1e^x$
$f'(x) = 3e +$

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"C" = punto crítico

1: f' y f'' $f(x) = -x^2$

$f'(x) = -2x \rightarrow$? "C" = 0

$f''(x) = -2$

2: $f'(x) = 0 \rightarrow C = (\check{x}, \check{y}) \rightarrow C = (0,0) \rightarrow$ Máx//

$-2x = 0$

$x = \frac{0}{-2}$

$x = 0$

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

$f(0) = 0$

$y = 0$

3: $f''(x) = 0 \rightarrow$ P.I = 0

$f''(x) > 0 \rightarrow$ P.min = +

$f''(x) < 0 \rightarrow$ P.Máx = −

$x = 0$

$f''(x) = -2$

$f''(0) = -2$

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

① $f'(x) = 6x^2 - 8x$

$f'(x) = 0$

$f''(x) = 12x - 8$

② $6x^2 - 8x = 0$

$x(6x - 8) = 0$

$x = 0 \quad 6x - 8 = 0$

$x = \frac{8}{6} \quad x_2 = \frac{4}{3}$

$y = 2x^3 - 4x^2$

$y = 2(0)^3 - 4(0)^2$

$y_1 = 0$

$y = 2\left(\frac{4}{3}\right)^3 - 4\left(\frac{16}{9}\right)$

$y = \frac{128}{27} - \frac{64}{9}$

$y_2 = \frac{-64}{27}$

$P_1 = (0,0) \quad P_2 = \left(\frac{4}{3} ; \frac{64}{23}\right)$

③ $f''(x) = 12x - 8$

$f''(0) = 12(0) - 8$

$= -8 < 0$ Máximo//

$f''\left(\frac{4}{3}\right) = 12\left(\frac{4}{3}\right) - 8$

$= 12 - 8$

$= 8 > 0$ mínimo//

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Actividad.

1: $\frac{5}{3} - \frac{4}{7} = \left(\frac{5}{3} \cdot \frac{7}{7}\right) - \left(\frac{4}{7} \cdot \frac{3}{3}\right) = \frac{35}{21} - \frac{12}{21} = \frac{23}{21}$

2: $\frac{1}{2} + \frac{3}{4} = \left(\frac{1}{2} \cdot \frac{4}{4}\right) + \left(\frac{3}{4} \cdot \frac{2}{2}\right) = \frac{4}{8} + \frac{6}{8} = \frac{10}{8}$

3: $\frac{5}{2} - \frac{3}{3} + \frac{3}{5} = \left(\frac{5}{2} \cdot \frac{15}{15}\right) - \left(\frac{2}{3} \cdot \frac{10}{10}\right) + \left(\frac{3}{5} \cdot \frac{6}{6}\right) = \frac{75}{30} - \frac{20}{30} + \frac{18}{30} = \frac{73}{30}$

4: $\frac{20}{9} + \frac{1}{2} = \left(\frac{20}{9} \cdot \frac{2}{2}\right) + \left(\frac{1}{2} \cdot \frac{9}{9}\right) = \frac{40}{18} + \frac{9}{18} = \frac{49}{18}$

5: $\frac{3}{7} + \frac{1}{5} - \frac{10}{3} = \left(\frac{3}{7} \cdot \frac{15}{15}\right) + \left(\frac{1}{3} \cdot \frac{21}{21}\right) - \left(\frac{10}{3} \cdot \frac{35}{35}\right) = \frac{45}{103} + \frac{32}{105} - \frac{350}{105} = \frac{-284}{105}$

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$(x) = sen(3x)$

$(x) = 3 \cdot \cos(3x)$

$g(x) = x - \frac{3}{2} \cdot sen(2x)$

$g'(x) = 1 - \frac{3}{2} \cdot 2 \cdot \cos(2x)$

$g'(x) = 1 - 3\cos(2x)$

$$\lim_{x \to 0} \frac{sen\,3x}{x - \frac{3}{2} sen\,2x} = \frac{0}{0}$$

$f(x) = sen(3x)$

$f'(x) = 3 \cdot \cos(3x)$

$g(x) = x - \frac{3}{2} \cdot sen(2x)$

$g'(x) = 1 - \frac{3}{2} \cdot 2 \cdot \cos(2x)$

$g'(x) = 1 - 3\cos(2x)$

$$\lim_{x \to 0} \frac{3\cos(3x)}{1 - 3\cos(2x)}$$

$$\lim_{x \to 0} \frac{3\cos(3 \cdot 0)}{1 - 3\cos(2 \cdot 0)}$$

$$\lim_{x \to 0} \frac{3 \cdot 1}{1 - 3 \cdot 1} = \frac{3}{-2} = \boxed{-\frac{3}{2}}$$

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Escaneado con CamScanner

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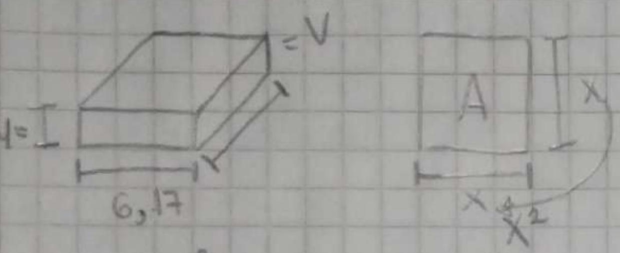
Leyes de exponentes.

- $a^0 = 1$
- $a^1 = a$
- $a^n \cdot a^m = a^{n+m}$
- $\frac{a^n}{a^m} = a^{n-m}$
- $(a^n)^m = a^{n \cdot m}$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
- $a^{-n} = \frac{1}{a^n}$
- $a = \frac{1}{a^n}$
- $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$
- $\sqrt[m]{a^n} = a^{\frac{n}{m}}$

Revisado

Caja



$V = 252 m^3 = y \cdot x \cdot x = V = x^2 \cdot y$

$f = \square = 5 \cdot x^2$
$T = \square = 2,5 \cdot x^2$
$L = \square = 3,5 \cdot 4 \cdot xy$

$f(x) = 5 \cdot x^2 + 2,5x^2 + 14xy$

$f(x) = 7,5x^2 + 14x\left(\frac{252}{x^2}\right)$

$f(x) = 7,5x^2 + \frac{3528}{x}$

$f'(x) = 15x + \left(\frac{3528}{x^2}\right)$

$f'(x) = -\frac{3528}{x^2} + 15x$

$-\frac{3528}{x^2} + 15x = 0$

$-\frac{3528}{x^2} = -15x$

$-3528 = -15x \cdot x^2$

$-3528 = -15x^3$

$x^3 = \frac{3528}{15}$

$x^3 = \frac{1176}{5}$

$\sqrt[3]{x^3} = \sqrt[3]{\frac{1176}{5}}$

$\boxed{x = 6,17}$

$f(x) = 7,5x^2 + \frac{3528}{x}$

$f(6,17) = 7.5(6.17)^2 + \frac{3528}{6.17}$

$f(6.17) = 285,51 + 571,79$

$f(6.17) = 857,3$

Aux

$b(x) = \frac{3528}{x^1}$

$b(x) = 3528 \cdot x^{-1-1}$

$b(x) = 3528 \cdot (-1) \cdot x^{-1}$

$b(x) = -3528 \cdot x^{-2}$

$b(x) = 3528 / x^2$

$y = \frac{252}{x^2}$

$y = \frac{252}{(6,17)^2}$

$y = 6,61$