Ejercicios de Refuerzo de Cálculo Diferencial.

$f(x) = x^5$

$f'(x) = 5 \cdot x^4$

$f(x) = 3x^7$

$f'(x) = 3 \cdot (7 \cdot x^6)$

$f'(x) = 21x^6$

• Regla de la Suma.

$f(x) = x^2 + 5x$

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

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

$f'(x) = 12x^2 - 2x$

Regla del producto. [illegible] de la [illegible]

$u'v + v'u$

$f(x) = x^2 \cdot \sin(x)$

$f'(x) = 2x \cdot \operatorname{sen}(x) + x^2 \cdot \cos(x)$

$f(x) = 3x^7$

$f'(x) = 0 \cdot x^7 + 7x^6 \cdot 3$

$f'(x) = 0 + 21x^6$

$f'(x) = 21x^6$

$f(x) = (2x+1) \cdot e^x$

$f'(x) = 2 \cdot e^x + e^x \cdot (2x+1)$

$f'(x) = 2e^x + 2xe^x + e^x$

$f'(x) = 3e^x + 2xe^x$ [illegible]

$u'v + v'u$

$+) x^2 \cdot \cos(x)$

$f(x) = (2x+1) \cdot e^x$

$f'(x) = 2 \cdot e^x + e^x \cdot (2x+1)$

$f'(x) = 2e^x + 2xe^x + e^x$

$f'(x) = 3e^x + 2xe^x$

Clase de Refuerzo de Calculo Diferencial.

Máximos y mínimos.

$f(x) = -x^2$

1) Encontrar primera y Segunda derivada.

$f'(x) = -2x$

$f''(x) = -2$

2) Igualar a Cero.

$f'(x) = = 0 \rightarrow c = (x, y) \rightarrow c = (0, 0)$ Punto crítico

$-2x = 0$

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

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

$f(0) = 0$

$y = 0$

3) $f''(x) = 0 = 0 \rightarrow$ Punto de Inflexión. 0

$f''(x) > 0 \rightarrow$ Punto mínimo. +

$f''(x) < 0 \rightarrow$ Punto máximo. −

$f''(x) = -2$

$f''(0) = -2 \therefore$ es máximo.

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

$f'(x) = 6x^2 - 8x$

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

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

mínimo

$6x^2 - 8x = 0$

$x(6x - 8) = 0$

$x_1 = 0$

$6x - 8 = 0$

$6x = 8$

$x = \cancel{\frac{8}{6}} = \frac{4}{3}$

$\rightarrow c_1 = \left(\frac{4}{3}, -\frac{64}{27}\right)$

$f\left(\frac{4}{3}\right) = 2\left(\frac{4}{3}\right)^3 - 4\left(\frac{4}{3}\right)^2$

$f(4/3) = 2 \cdot \frac{64}{27} - 4 \cdot \frac{16}{9}$

$f(4/3) = \frac{128}{27} - \frac{64}{9}$

$f(4/3) = -\frac{64}{27}$

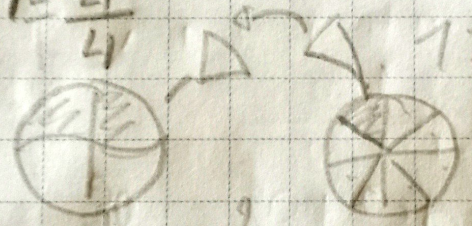
$\frac{128}{27} - \frac{64}{9}$

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

$\frac{128}{27} - \frac{64}{9} \cdot \frac{3}{3}$

$\frac{128}{27} - \frac{192}{27} = -\frac{64}{27}$

$1 = \frac{4}{4}$ $\quad$ $1 = \frac{8}{8}$



$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ $\quad$ $\frac{1}{8} + \frac{1}{4} \cdot \frac{2}{2}$

$\frac{1}{4} = \frac{2}{8}$

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

$f''(4/3) = 12(4/3) - 8$

$f''(4/3) = 16 - 8 = 8$ ✓

$c_2 = (0, 0)$ min

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

$f(0) = 0$

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

$f''(0) = -8$ máx

UTEQ #Un legado transformador

Clase de Refuerzo Calculo Diferencial

L'Hópital

$$\lim_{x \to 0} \frac{0}{0} \quad \text{ó} \quad \frac{\infty}{\infty}$$

$$\lim_{x \to 1} \frac{\ln x}{x-1} = \lim_{x \to 1} \frac{\frac{1}{x}}{1} = \lim_{x \to 1} \frac{1}{x} = \frac{1}{1} = 1 \checkmark$$

$$f(x) = \ln(x) \qquad g(x) = x-1 \qquad f(x) = e^x$$
$$f'(x) = \frac{1}{x} \qquad g'(x) = 1 \qquad f'(x) = e^x$$

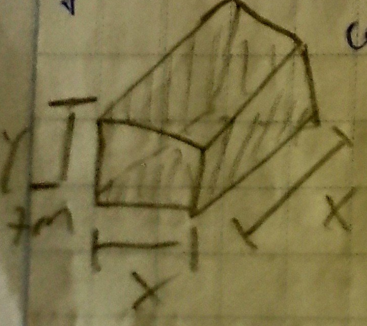
$$\lim_{x \to 0} \frac{\operatorname{sen} 3x}{x - \frac{3}{2}\operatorname{sen} 2x} = \frac{0}{0}$$

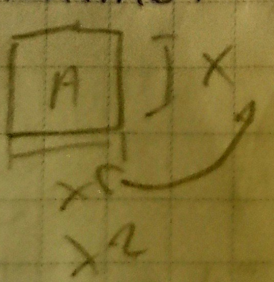
cos = 1
sen = 0

$$f(x) = \operatorname{sen}(3x) \qquad g(x) = x - \frac{3}{2}\operatorname{sen}(2x)$$
$$f'(x) = \cos(3x) \cdot 3 \qquad g'(x) = 1 - \frac{3}{\cancel{2}} \cdot \cancel{2} \cdot \cos(2x)$$
$$f'(x) = 3\cos(3x) \qquad g'(x) = 1 - 3\cos(2x)$$

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

Una Caja Cerrada con base Cuadrada va a contener un volumen de $252\,m^3$, el fondo cuesta \$5.00, la tapa \$2.50 y los lados \$3.50 por m^2. Indicar cuales son las dimensiones que minimizan el costo de la caja y determinar cuál es el costo mínimo.





A = 2
V 3

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

$F: D = 5 \cdot x^2$

$T: D = 2{,}5 \cdot x^2$ } Se suman

$L: D = 3{,}5 \cdot 4 \cdot xy$

$x^2 \cdot y = 252$

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

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

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

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

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

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

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

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

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

$-3528 = 15x^3$

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

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

$\sqrt[3]{x^3} = \sqrt[3]{\frac{1176}{5}} \rightarrow \boxed{x = 6{,}17}$

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

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

$b'(x) = 3528 \cdot (-1) \cdot x^{-2}$

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

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

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

$f(6{,}17) = 7{,}5(6{,}17)^2 - \frac{3528}{(6{,}17)}$

$f(6{,}17) = 285{,}51 - 571{,}79$

$\boxed{f(6{,}17) = 857{,}3}$

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

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

$$y = 6{,}61$$