01 - Derivada de Orden Superior.

1. $y = 2\operatorname{Sen}(x) + 6\operatorname{Cos}(x)$, encontrar y''''

$y' = 2\operatorname{Cos}(x) - 6\operatorname{Sin}(x)$

$y'' = -2\operatorname{Sin}(x) - 6\operatorname{Cos}(x)$

$y''' = -2\operatorname{Cos}(x) + 6\operatorname{Sin}(x)$

$y'''' = 2\operatorname{Sin}(x) + 6\operatorname{Cos}(x)$

Nota: despues de la derivada tercera se escribe

$$f^{(4)}(x) = y^{(4)} = D_x^4 y = \frac{d^4 y}{dx^4}$$

$$\vdots \qquad \vdots \qquad \vdots \qquad \vdots$$

$$f^{(n)}(x) = y^{(n)} = D_x^n y = \frac{d^n y}{dx^n}$$

2. $y = 3x^4 - 2x^2 - x$, $\quad y''' = ?$

$y' = 12x^3 - 4x - 1$

$y'' = 36x^2 - 4$

$y''' = 72x$

3. $y = e^{3x^5 - 2x^2}$, $\quad y'' = ?$

$y' = e^{3x^5 - 2x^2}(15x^4 - 4x)$

$y'' = e^{3x^5 - 2x^2}(15x^4 - 4x)^2 + e^{3x^5 - 2x^2}(60x^3 - 4)$

4. $y = x^3 + \cos x^2$ Calcule y'''

Primera derivada.

$y' = 3x^2 - 2x \sin x^2$ ✓

Segunda derivada.

$y'' = 6x - \left(2\sin(x^2) + 2x \cos(x^2) \cdot (2x)\right)$

$y'' = 6x - 2\sin(x^2) - 4x^2 \cos(x^2)$

Tercera derivada.

$y''' = 6 - 2\left(2x \cos(x^2)\right) - 4\left(2x\cos(x^2) - x^2 \sin(x^2)(2x)\right)$

$y''' = 6 - 4x \cos(x^2) - 8x \cos(x^2) + 8x^3 \sin(x^2)$

$y''' = 6 - 12x \cos(x^2) + 8x^3 \sin(x^2)$