

PAUTA TEST N° 5 CÁLCULO 1 CÁLCULO DIFERENCIAL
INGENIERÍA AMBIENTAL – INGENIERÍA CIVIL AGRÍCOLA

NOMBRE : _____ **CARRERA:** _____
TIEMPO MÁXIMO : 30 MINUTOS **FECHA : Mi 10/05/23**

1) Calcule $y'(x)$ si $y(x) = \text{Arctg}(x) - \frac{1}{x} + \frac{\cos(x)}{1+x^2} + e$

(30 puntos)

Solución:

$$\begin{aligned} y(x) &= \text{Arctg}(x) - \frac{1}{x} + \frac{\cos(x)}{1+x^2} + e \Rightarrow \\ y'(x) &= [\text{Arctg}(x)]' - \left(\frac{1}{x}\right)' + \left[\frac{\cos(x)}{1+x^2}\right]' + (e)' \Rightarrow \\ y'(x) &= \frac{1}{1+x^2} - (x^{-1})' + \frac{(\cos(x))'(1+x^2) - \cos(x)(1+x^2)'}{(1+x^2)^2} + 0 \Rightarrow \\ y'(x) &= \frac{1}{1+x^2} + x^{-2} + \frac{-\sin(x)(1+x^2) - \cos(x)(2x)}{(1+x^2)^2} \quad \square \end{aligned}$$

2) Obtenga $\frac{d^2y}{dx^2}$ si $y = e^{x^2} - \sec(x)$

(30 puntos)

Solución:

$$\begin{aligned} y &= e^{x^2} - \sec(x) \Rightarrow \\ y'(x) &= (e^{x^2})' - (\sec(x))' = e^{x^2}(x^2)' - \sec(x) \text{tg}(x) = 2x e^{x^2} - \sec(x) \text{tg}(x) \\ y''(x) &\equiv \frac{d^2y}{dx^2} = (2x e^{x^2})' - (\sec(x) \text{tg}(x))' = \\ &= (2x)' e^{x^2} + 2x (e^{x^2})' - [(\sec(x))' \text{tg}(x) + \sec(x) (\text{tg}(x))'] = \\ &= 2 e^{x^2} + 2x 2x e^{x^2} - \sec(x) \text{tg}(x) \text{tg}(x) - \sec(x) \sec^2(x) = \\ &= 2 e^{x^2} + 4x^2 e^{x^2} - \sec(x) \text{tg}^2(x) - \sec^3(x) \quad \square \end{aligned}$$