

Calcular las rectas tangente y normal de la siguientes funciones en $x = 2$:

1. $f(x) = e^{x^2-1}$

2. $f(x) = x^2 - x + 1$

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

Solución:

1. $f(x) = e^{x^2-1} \implies f(2) = e^3, (2, e^3)$ y $f'(x) = 2xe^{x^2-1} \implies m = f'(2) = 4e^3$

Recta Tangente: $y - e^3 = 4e^3(x - 2)$

Recta Normal: $y - e^3 = -\frac{1}{4e^3}(x - 2)$

2. $f(x) = x^2 - x + 1 \implies f(2) = 3, (2, 3)$ y $f'(x) = 2x - 1 \implies m = f'(2) = 3$

Recta Tangente: $y - 3 = 3(x - 2)$

Recta Normal: $y - 3 = -\frac{1}{3}(x - 2)$

3. $f(x) = \frac{x^2 + 1}{x^2 - 1} \implies f(2) = \frac{5}{3}, \left(2, \frac{5}{3}\right)$ y $f'(x) = \frac{-4x}{(x^2 - 1)^2} \implies m = f'(2) = -\frac{8}{9}$

Recta Tangente: $y - \frac{5}{3} = -\frac{8}{9}(x - 2)$

Recta Normal: $y - \frac{5}{3} = \frac{9}{8}(x - 2)$