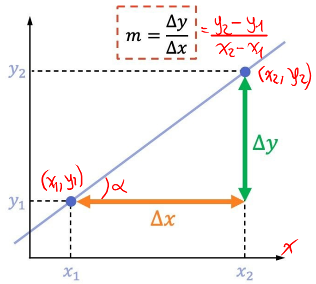
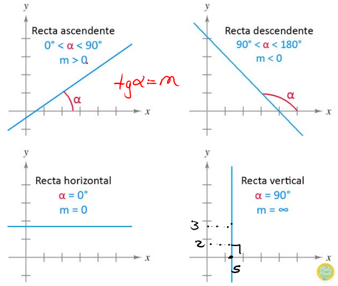
PENDIENTE: Inclinación de una recta



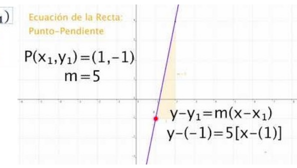


ECUACIÓN PUNTO-PENDIENTE DE UNA RECTA

$y - y_1 = m * (x - x_1)$

m → Pendiente

$P(x_1 y_1)$ → Punto



$y + 1 = 5x - 5$

$y = 5x - 5 - 1$

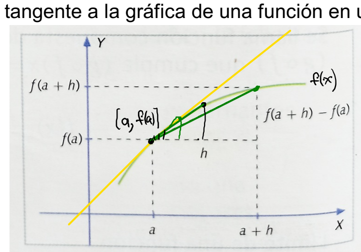
$\boxed{y = 5x - 6}$

Calcula la pendiente de la recta que pasa por los puntos:

a) $\overset{x_1\,y_1}{(5,2)}, \overset{x_2\,y_2}{(5,3)}$ $\quad m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-2}{5-5} = \frac{1}{0} = \infty$

b) $\overset{x_1\,y_1}{(-4,4)}, \overset{x_2\,y_2}{(6,-6)}$ $\quad m = \frac{-6-4}{6-(-4)} = \frac{-10}{10} = -1$

DEFINICIÓN DE DERIVADA: La pendiente de la recta tangente a la gráfica de una función en un punto P.



$m = \frac{\Delta y}{\Delta x} = \frac{f(a+h) - f(a)}{\cancel{a}+h-\cancel{a}} = \frac{f(a+h)-f(a)}{h}$

$\boxed{\lim_{h\to 0} \frac{f(a+h)-f(a)}{h}} = f'(x)$

Calcula la derivada de la función $f_{(x)} = x^2 - \cancel{3}$ en el punto $x = 2$

$\lim_{h\to 0} \frac{f(a+h) - f(a)}{h}$

$\lim_{h\to 0} \frac{f(2+h) - f(2)}{h}$

$\lim_{h\to 0} \frac{(2+h)^2 - 3 - [2^2 - 3]}{h}$

$\lim_{h\to 0} \frac{\cancel{4} + 4h + h^2 - \cancel{3} - \cancel{4}}{h}$

$\lim_{h\to 0} \frac{\cancel{h}(4+h)}{\cancel{h}}$

$\lim_{h\to 0} 4 + h = 4 + 0 = 4 = m$

$y = 2^2 - 3$

$\boxed{y = 1 \quad x = 2}$

$y - y_1 = m(x - x_1)$

$y - 1 = 4(x - 2)$

$y - 1 = 4x - 8$

$\boxed{y = 4x - 7}$

$\lim_{h\to 0} \frac{f(a+h) - f(a)}{h}$

$\lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$

$\lim_{h\to 0} \frac{(x+h)^2 - 3 - (x^2 - 3)}{h}$

$\lim_{h\to 0} \frac{\cancel{x^2} + 2xh + h^2 - \cancel{3} - \cancel{x^2} + \cancel{3}}{h}$

$\lim_{h\to 0} \frac{\cancel{h}(2x+h)}{\cancel{h}}$

$\lim_{h\to 0} 2x + h = 2x + 0$

$\boxed{f'(x) = 2x}$

$2x^{2-1} = 2x$

$y = 3^2 - 3$

$\boxed{y = 6 \quad x = 3}$

$m = 2 \cdot 3$

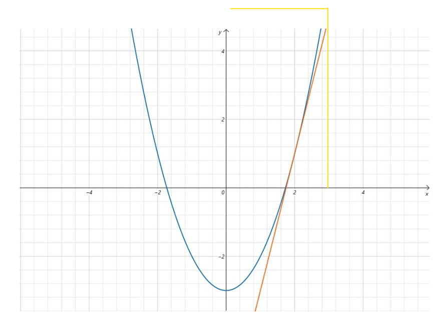
$\boxed{m = 6}$

$y - y_1 = m(x - x_1)$

$y - 6 = 6(x - 3)$

$y - 6 = 6x - 18$

$\boxed{y = 6x - 12}$



Calcula la derivada de la función $f_{(x)} = \frac{1}{x^2 - 3}$ en el punto $x = 1$

$f'(x) = \lim_{h\to 0} \frac{f(a+h) - f(a)}{h}$

$\lim_{h\to 0} \frac{f(x+h) - f(x)}{h} = \lim_{h\to 0} \frac{\frac{1}{(x+h)^2 - 3} - \frac{1}{x^2 - 3}}{h}$

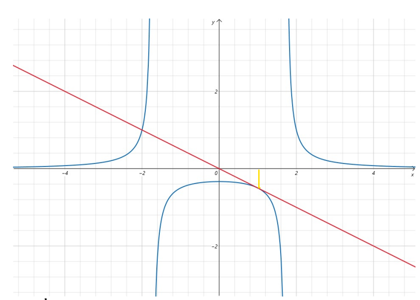
$\lim_{h\to 0} \frac{\frac{1}{x^2 + 2xh + h^2 - 3} - \frac{1}{x^2 - 3}}{h}$

$\lim_{h\to 0} \frac{\frac{x^2 - 3 - (x^2 + 2xh + h^2 - 3)}{(x^2 + 2xh + h^2 - 3)(x^2 - 3)}}{h}$

$\lim_{h\to 0} \frac{\frac{\cancel{x^2} - \cancel{3} - \cancel{x^2} - 2xh - h^2 + \cancel{3}}{(x^2 + 2xh + h^2 - 3)(x^2 - 3)}}{h}$

$\lim_{h\to 0} \frac{\frac{-\cancel{h}(2x + h)}{(x^2 + 2xh + h^2 - 3)(x^2 - 3)}}{\frac{\cancel{h}}{1}}$

$\lim_{h\to 0} \frac{-(2x+h)}{(x^2 + 2xh + h^2 - 3)(x^2 - 3)} = \frac{-(2x+0)}{(x^2 + \cancel{2x \cdot 0} + \cancel{0^2} - 3)\cancel{(x^2 - 3)}} = \frac{-2x}{(x^2 - 3)^2}$



$\boxed{f'(x) = \frac{-2x}{(x^2 - 3)^2}}$

$f'(1) = \frac{-2(1)}{(1-3)^2}$

$f'(1) = \frac{-\cancel{2}^{1}}{\cancel{4}_{2}}$

$\boxed{f'(1) = -\frac{1}{2}}$