

Ejercicios desarrollados de la primera derivada con reglas generales y aplicación de las mismas en interpretación geométrica de la primera derivada.

Derivada general

1. Obtenga la derivada de $2x^2-3x+8$

$$1) \quad y+\Delta y=2(X+\Delta X)^2-3(X+\Delta X)+8$$

$$y+\Delta y=2X^2+4x\Delta x+2\Delta^2X-3X+3\Delta X+8$$

$$2) \quad \begin{array}{r} -y \quad = -2x^2 \quad \quad \quad +3x \quad \quad -8 \\ \hline \Delta y=4x\Delta x+2\Delta^2X+3\Delta X \end{array}$$

$$3) \quad \frac{\Delta y}{\Delta x} = \frac{4x\Delta x+2\Delta^2x+3\Delta x}{\Delta x}$$

$$\frac{\Delta y}{\Delta x} = 4x + 2\Delta^2x + 3$$

$$4) \quad \lim_{\Delta X \rightarrow 0} \frac{\Delta y}{\Delta x} = 4x + 2\Delta^2x + 3$$

$$\frac{\Delta y}{\Delta x} = 4x + 2(0) + 3$$

$$\frac{\Delta y}{\Delta x} = 4x + 3$$

$$y' = 4x + 3$$

2. Obtenga la derivada de $3x^2+4x+7$

$$1) \quad y+\Delta y=3(X+\Delta X)^2+4(X+\Delta X)+7$$

$$y+\Delta y=3X^2+6x\Delta x+3\Delta^2X+4X+4\Delta X+7$$

$$2) \quad \begin{array}{r} -y \quad = -3x^2 \quad \quad \quad -4x \quad \quad -7 \\ \hline \Delta y=6x\Delta x+3\Delta^2X+4\Delta X \end{array}$$

$$3) \quad \frac{\Delta y}{\Delta x} = \frac{6x\Delta x+3\Delta^2x+4\Delta x}{\Delta x}$$

$$\frac{\Delta y}{\Delta x} = 6x + 3\Delta^2x + 4$$

$$4) \quad \lim_{\Delta X \rightarrow 0} \frac{\Delta y}{\Delta x} = 6 + 3\Delta^2x + 4$$

$$\frac{\Delta y}{\Delta x} = 6x + 3(0) + 4$$

$$\frac{\Delta y}{\Delta x} = 6x + 4$$

$$y' = 6x + 4$$

Pendiente, función pendiente, ecuación tangente y ecuación normal

- Determine la pendiente, ecuación tangente, ecuación normal y grafico de la siguiente función $y=2x^2-3x+4$ en el punto $A=-1,9$.

$$1) y' \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{(2(x+\Delta x)^2 - 3(x+\Delta x) + 4) - (2x^2 - 3x + 4)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{(2x^2 + 4x\Delta x + 2\Delta^2 x - 3x - 3\Delta x + 4) - (2x^2 + 3x - 4)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{2x^2 + 4x\Delta x + 2\Delta^2 x - 3x - 3\Delta x + 4 - 2x^2 - 3x + 4}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{4x\Delta x + 2\Delta^2 x - 3\Delta x}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} (4x + 2\Delta x - 3)$$

$$y' = 4x + 2(0) - 3$$

$$y' = 4x - 3$$

$$2) m = 4x - 3$$

$$m = 4(-1) - 3$$

$$m = -4 - 3$$

$$m = -7$$

$$3) y - y_1 = m(x - x_1)$$

$$y - 9 = -7(x - 1)$$

$$y - 9 = -7x + 7$$

$$y - 7x = 7 + 9$$

$$y - 7x = 16$$

$$4) y - y_1 = -\frac{1}{m}(x - x_1)$$

$$y - 9 = \frac{1}{7}(x + 1)$$

$$7(y - 9) = 1(x + 1)$$

$$7y - 63 = x + 1$$

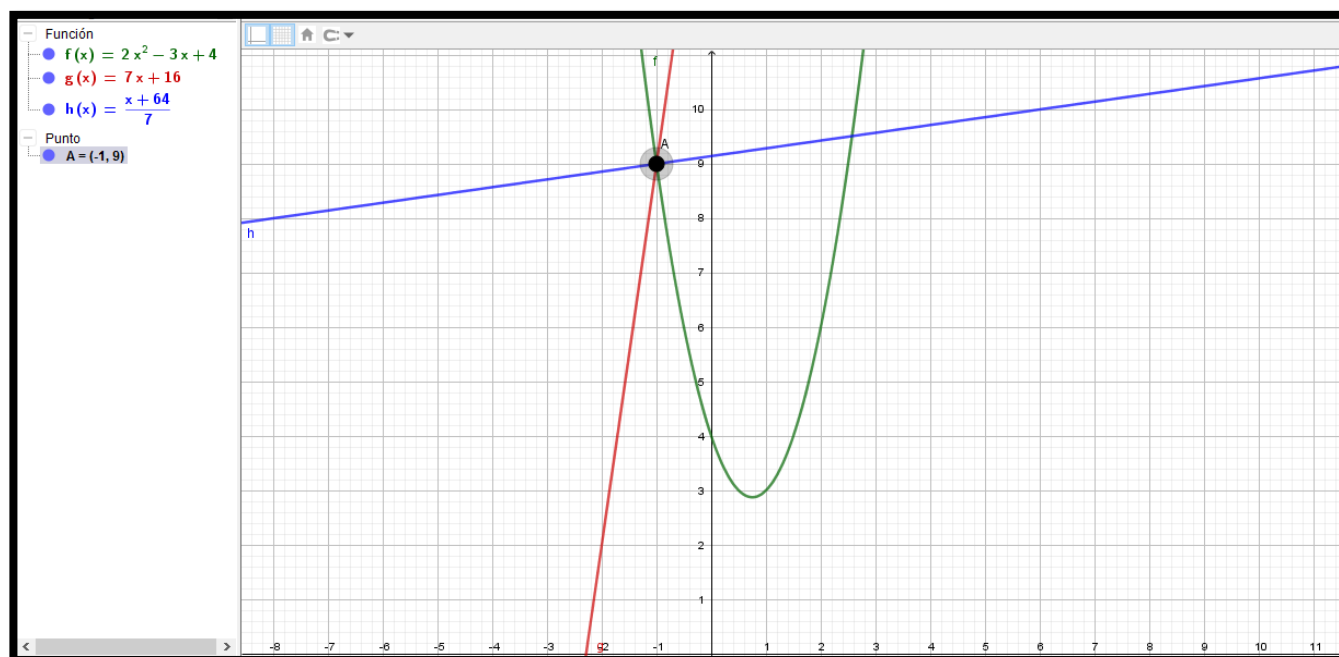
$$7y = x + 1 + 63$$

$$y = \frac{x + 64}{7}$$

X	y = 2x ² - 3x + 4
-2	18
-1	9
0	4
1	3
2	6
3	13
4	24

X	y = 7x + 16
-2	2
-1	9
0	16
1	23
2	30
3	37
4	44

X	y = $\frac{x + 64}{7}$
-2	$\frac{62}{7} = 8.85$
-1	9
0	$\frac{64}{7} = 9.1$
1	$\frac{65}{7} = 9.3$
2	$\frac{66}{7} = 9.4$
3	$\frac{67}{7} = 9.6$
4	$\frac{68}{7} = 9.7$



2. Determine la pendiente, ecuación tangente, ecuación normal y grafico de la siguiente función $y = 3x^2 - 3x + 6$ en el punto $A = -1, 12$.

$$1) y' \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{(3(x+\Delta x)^2 - 3(x+\Delta x) + 6) - (3x^2 - 3x + 6)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{(3x^2 + 6x\Delta x + 3\Delta^2 x - 3x - 3\Delta x + 6 - 3x^2 + 3x - 6)}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{3x^2 + 6x\Delta x + 3\Delta^2 x - 3x - 3\Delta x + 6 - 2x^2 + 3x - 6}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} \frac{6x\Delta x + 3\Delta^2 x - 3\Delta x}{\Delta x}$$

$$y' \lim_{\Delta x \rightarrow 0} (6x + 3\Delta x - 3)$$

$$y' = 6x + 3(0) - 3$$

$$y' = 6x - 3$$

$$2) m = 6x - 3$$

$$m = 6(-1) - 3$$

$$m = -6 - 3$$

$$m = -9$$

$$3) y - y_1 = m(x - x_1)$$

$$y - 12 = -9(x - 1)$$

$$y - 12 = -9x + 9$$

$$y - 9x = 9 + 12$$

$$y - 9x = 21$$

$$y = 9x + 21$$

$$4) y - y_1 = -\frac{1}{m}(x - x_1)$$

$$y - 12 = \frac{1}{9}(x + 1)$$

$$9(y - 12) = 1(x + 1)$$

$$9y - 108 = x + 1$$

$$9y = x + 1 + 108$$

$$y = \frac{x + 109}{9}$$

X	$y = 3x^2 - 3x + 6$
-2	24
-1	12
0	6
1	6
2	12
3	24
4	42

X	$y = 9x + 21$
-2	3
-1	12
0	21
1	30
2	39
3	48
4	57

X	$y = \frac{x + 109}{9}$
-2	$\frac{107}{9} = 11.9$
-1	12
0	$\frac{109}{9} = 12.1$
1	$\frac{110}{9} = 12.2$
2	$\frac{37}{3} = 12.3$
3	$\frac{112}{9} = 12.4$
4	$\frac{113}{9} = 12.5$

