Ej. $f(x) = 8x$

① Encontrar $f(x+h)$

$f(x+h) = 8(x+h)$

$f(x) = 8x$

② Evaluar el límite.

$$\lim_{h\to 0} \frac{8(x+h) - [8x]}{h}$$

$$\lim_{h\to 0} \frac{8x + 8h - 8x}{h}$$ Simplificar

$$\lim_{h\to 0} \frac{8\cancel{h}}{\cancel{h}}$$

$$\lim_{h\to 0} 8 = 8$$ → La Derivada.

$f(x)$

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

$a^2 - b^2 = (a-b)(a+b)$

$f(2) = 8(2)$

$f(2+1) = 8(2+1)$

$f(x+h) = 8(x+h)$

$f(\tan 3x + 5x) = 8(\tan 3x + 5x)$

Factorizar y Expandir.

$(a+b)^2 = a^2 + 2ab + b^2$ → B menos

$(a-b)^2 = a^2 - 2ab + b^2$ → B menos

$2a + 3a + 4a = a(2+3+4)$ → F.C.

$\frac{\sqrt{9+x} - 4}{a} \cdot \frac{\sqrt{9+x} + 4}{\sqrt{9+x} + 4}$ → Conjugada.

Ejercicio.

$f(x) = 9x$

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

② $f(x) = ax^1$

$f'(x) = a$

$f(x+h) = 9(x+h)$

$$\lim_{h\to 0} \frac{9(x+h) - [9x]}{h}$$

$$\lim_{h\to 0} \frac{9x + 9h - 9x}{h}$$

$$\lim_{h\to 0} \frac{9h}{h} \qquad \lim_{h\to 0} 9 = 9$$

Ejercicio.

$f(x) = 9x^2$

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

¿Cuál es el exp menor?

$9(x+h)^2$

$9(x^2 + 2xh + h^2)$

$9x^2 + 18xh + 9h^2$

- $f(x+h) = 9(x+h)^2$

  $f(x) = 9x^2$

$$\lim_{h\to 0} \frac{9(x+h)^2 - [9x^2]}{h}$$

$$\lim_{h\to 0} \frac{9x^2 + 18xh + 9h^2 - 9x^2}{h}$$ ① Expandir.

$$\lim_{h\to 0} \frac{18xh + 9h^2}{h}$$ ② Factorizar.

$$\lim_{h\to 0} \frac{\cancel{h}(18x + 9h)}{\cancel{h}}$$

$$\lim_{h\to 0} 18x + 9h = 18x + 9(0)$$

$= 18x + 0$

$= 18x$ → Derivada.

$f(x) = 10x^2$ $\qquad \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ $\qquad$ T= 5min

$$\lim_{h\to 0} \frac{10(x+h)^2 - 10x^2}{h}$$

3 $\quad f(x) = Kx^n$

$f'(x) = K \cdot n\, x^{n-1}$

$$\lim_{h\to 0} \frac{10(x^2+2xh+h^2) - 10x^2}{h}$$

$$\lim_{h\to 0} \frac{10x^2 + 20xh + 10h^2 - 10x^2}{h}$$ Simplificar.

$$\lim_{h\to 0} \frac{20xh + 10h^2}{h}$$ Factor Común.

$$\lim_{h\to 0} \frac{\cancel{h}(20x + 10h)}{\cancel{h}}$$

$$\lim_{h\to 0} 20x + 10h = 20x + 10(0) = 20x + 0$$
$$= 20x$$

← Demostrar.

Tarea. Triangulo de pascal para binomios.

$f(x) = 9x^2 + 10x^2 + 8x^3$ $\qquad \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$f(x+h) = 9(x+h)^2 + 10(x+h)^2 + 8(x+h)^3$

$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

$$\lim_{h\to 0} \frac{9\underbrace{(x+h)^2}_{\text{Exp.}} + 10\underbrace{(x+h)^2}_{\text{Exp.}} + 8\underbrace{(x+h)^3}_{\text{Exp.}} - [9x^2 + 10x^2 + 8x^3]}{h}$$

$$\lim_{h\to 0} \frac{9(x^2+2xh+h^2) + 10(x^2+2xh+h^2) + 8(x^3+3x^2h+3xh^2+h^3) - 9x^2 - 10x^2 - 8x^3}{h}$$

$$\lim_{h\to 0} \frac{9x^2 + 18xh + 9h^2 + 10x^2 + 20xh + 10h^2 + 8x^3 + 24x^2h + 24xh^2 + 8h^3 - 9x^2 - 10x^2 - 8x^3}{h}$$

$$\lim_{h\to 0} \frac{18xh + 9h^2 + 20xh + 10h^2 + 24x^2h + 24xh^2 + 8h^3}{h}$$

$$\lim_{h\to 0} \frac{\cancel{h}(18x + 9h + 20x + 10h + 24x^2 + 24xh + 8h^2)}{\cancel{h}}$$

$$\lim_{h\to 0} 18x + 9h + 20x + 10h + 24x^2 + 24xh + 8h^2$$

$$\lim_{h\to 0} 18x + 9(0) + 20x + 10(0) + 24x^2 + 24x(0) + 8(0)^2$$

$$= 18x + 0 + 20x + 0 + 24x^2 + 0 + 0 = 18x + 20x + 24x^2$$

Derivadas.

$f(x) = 1x^2 - 8x + 9$ $\quad f'(x) = 2x - 8$

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

$$\lim_{h \to 0} \frac{\left[(x+h)^2 - 8(x+h) + 9\right] - \left[x^2 - 8x + 9\right]}{h}$$

$$\lim_{h \to 0} \frac{\left[(x+h)^2 - 8(x+h) + 9\right] - x^2 + 8x - 9}{h}$$

$$\lim_{h \to 0} \frac{(x+h)^2 - \cancel{8x} - 8h + \cancel{9} - x^2 + \cancel{8x} - \cancel{9}}{h}$$

$$\lim_{h \to 0} \frac{\cancel{x^2} + 2xh + h^2 - 8h - \cancel{x^2}}{h}$$

$$\lim_{h \to 0} \frac{\cancel{h}(2x + h - 8)}{\cancel{h}}$$

$$\lim_{h \to 0} 2x + h - 8 = 2x - 8 = m$$

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

$f(2) = (2)^2 - 1 = 3$

$f(2+y) = (2+y)^2 - 1 = 4 + 4y + y^2 - 1$

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

$$\lim_{h \to 0} \frac{[(x+h)^2 - 1] - [x^2 - 1]}{h}$$

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

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

$$\lim_{h \to 0} \frac{2xh + h^2}{h}$$

factorizar

Simplificar

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

Derivada

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

$$P\begin{pmatrix} x & y \\ 2, & 4 \end{pmatrix}$$

$m = 2(2)$

$m = 4$