Hallar la derivada de la función f(x) = $3x^2$ en el punto x = 2.

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

$$= \lim_{h\to 0} \frac{3(4+4h+h^2)-12}{h} = \lim_{h\to 0} \frac{3h^2+12h}{h} =$$

$$= \lim_{h\to 0} (3h+12) = 12$$

Calcular la derivada de la función f(x) = $x^2 + 4x - 5$ en x = 1.

$$f'(1) = \lim_{h\to 0} \frac{f(1+h)-f(1)}{h} =$$

$$= \lim_{h\to 0} \frac{(1+h)^2 + 4(1+h) - 5 - \left(1^2 + 4\cdot 1 - 5\right)}{h} =$$

$$= \lim_{h\to 0} \frac{1+2h+h^2+4+4h-5}{h} = \lim_{h\to 0} \frac{h^2+6h}{h} =$$

$$\lim_{h\to 0} (h+6) = 6$$

Calcular derivada de f(x) = $x^2 - x + 1$ en x = −1, x = 0 y x = 1.

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

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

$$= \lim_{h\to 0} \frac{x^2 + 2hx + h^2 - x - h + 1 - x^2 + x - 1}{h} =$$

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

$$= \lim_{h\to 0} \left(2x + h - 1\right) = 2x - 1$$

f'(−1), f'(0) y f'(1).

f'(−1) = 2(−1) − 1 = **−3**

f'(0) = 2(0) − 1 = −1

f'(1) = 2(1) − 1 = **1**

Calcular derivada de $f(x)=2x^2-6x+5$ en x = −5.

$$f'(x)=\lim_{h\to 0}\frac{2(x+h)^2-6(x+h)+5-\left(2x^2-6x+5\right)}{h}=$$

$$=\lim_{h\to 0}\frac{2x^2+4xh+2h^2-6x-6h+5-2x^2+6x-5}{h}=$$

$$=\lim_{h\to 0}\frac{4xh-6h+2h^2}{h}=\lim_{h\to 0}\frac{h(4x-6+2h)}{h}=4x-6$$

$$f'(-5)=4(-5)-6=-26$$

Calcular derivada de $f(x)=x^3+2x-5$ en x = 1.

$$f'(x)=\lim_{h\to 0}\frac{(x+h)^3+2(x+h)-5-\left(x^3+2x-5\right)}{h}=$$

$$=\lim_{h\to 0}\frac{x^3+3x^2h+3xh^2+h^3+2x+2h-5-x^3-2x+5}{h}=$$

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

$$f'(1)=3(1)^2+2=5$$

Calcular derivada de $f(x)=\frac{1}{x}$ en x = 2.

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

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

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

Calcular derivada de $f(x)=\sqrt{x}$ en x = 3.

$$f'(3)=\lim_{h\to 0}\frac{\sqrt{3+h}-\sqrt{3}}{h}=\lim_{h\to 0}\frac{\left(\sqrt{3+h}-\sqrt{3}\right)\left(\sqrt{3+h}+\sqrt{3}\right)}{h\left(\sqrt{3+h}+\sqrt{3}\right)}=$$

$$\lim_{h\to 0}\frac{(3+h)-3}{h\left(\sqrt{3+h}+\sqrt{3}\right)}=\lim_{h\to 0}\frac{h}{h\left(\sqrt{3+h}+\sqrt{3}\right)}=$$

$$\lim_{h\to 0}\frac{1}{\sqrt{3+h}+\sqrt{3}}=\frac{1}{\sqrt{3}+\sqrt{3}}=\frac{1}{2\sqrt{3}}$$

Calcular derivada de $f(x)=\frac{x}{x-1}$ en x = 2.

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

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

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

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