UEA UNIVERSIDAD ESTATAL AMAZÓNICA

MATEMÁTICAS I

Nombre: Anthony Curipallo

Carrera: Tecnologías de la Información

Fecha: 22/08/2023

Calcule las siguientes derivadas por definición.

$f(x) = 2x^2$

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

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

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

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

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

$$f'(x) = \lim_{h\to 0} \frac{\cancel{h}(4x+2h)}{\cancel{h}} = 4x + 2\cdot 0$$

$$f'(x) = 4x$$

$f(x) = 2x^2 + 5x$

$f(x+h) = 2(x+h)^2 + 5(x+h)$

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

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

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

$$f'(x) = \lim_{h\to 0} \frac{\cancel{2x^2} + 4xh + 2h + \cancel{5x} + 5h - \cancel{2x^2} - \cancel{5x}}{h}$$

$$f'(x) = \lim_{h\to 0} \frac{4xh + 2h + 5h}{h}$$

$$f'(x) = \lim_{h\to 0} \frac{\cancel{h}(4x+2h+5)}{\cancel{h}} = 4x + 2\,0 + 5$$

$$f'(x) = 4x + 5$$

UEA UNIVERSIDAD ESTATAL AMAZÓNICA

$f(x) = x+1$

$f(x+h) = (x+h)+1$

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

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

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

$$\lim_{h \to 0} \frac{1\cancel{h}}{\cancel{h}}$$

$$f'(x) = 1$$

$f(x)\ 3x+5$

$f(x+h) = 3(x+h)+5$

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

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

$$f'(x) = \lim_{h \to 0} \frac{\cancel{3x} + 3h \cancel{+5} \cancel{-3x} \cancel{-5}}{h}$$

$$f'(x) = \lim_{h \to 0} \frac{3\cancel{h}}{\cancel{h}}$$

$$f'(x) = 3$$

UEA
UNIVERSIDAD
ESTATAL AMAZÓNICA

$f(x) = 2x - 4$

$f(x+h) = 2(x+h) - 4$

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

$$f'(x) = \lim_{h \to 0} \frac{2(x+h) - 4 - (2x - 4)}{h}$$

$$f'(x) = \lim_{h \to 0} \frac{\cancel{2x} + 2h \cancel{- 4} \cancel{- 2x} \cancel{+ 4}}{h}$$

$$f'(x) = \lim_{h \to 0} \frac{2\cancel{h}}{\cancel{h}}$$

$$f'(x) = 2$$