

"Universidad Técnica de Ambato"

Facultad de Contabilidad y Auditoría
Carrera de Economía

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2do Semestre "A"
30/11/2024

Tema: Ejercicios.

8,00

Función continua o continuidad de una función

$$f(x) = \begin{cases} x^3 - 3x & \text{si } x \text{ es menor que } 2 \\ 6 - x^2 & \text{si } x \text{ es } \geq 2 \end{cases}$$

$$\lim_{x \rightarrow a^-} = \lim_{x \rightarrow a^+} = f(x) = 2$$

$$\lim_{x \rightarrow 2^-} x^3 - 3x = \lim_{x \rightarrow 2^+} 6 - x^2 = f(2) = 6 - x^2$$

$$\lim_{x \rightarrow 2^-} x^3 - 3x$$

$$\lim_{x \rightarrow 2^+} 6 - x^2$$

$$f(2) = 6 - x^2$$

$$\lim_{x \rightarrow 2^-} (2)^3 - 3(2)$$

$$\lim_{x \rightarrow 2^+} 6 - (2)^2$$

$$f(2) = 6 - (2)^2$$

$$\lim_{x \rightarrow 2^-} 8 - 6$$

$$\lim_{x \rightarrow 2^+} 6 - 4$$

$$f(2) = 6 - 4$$

$$\lim_{x \rightarrow 2^-} 2$$

$$\lim_{x \rightarrow 2^+} 2$$

$$f(2) = 2$$

$$f(x) = \begin{cases} 2ax + 1 & \text{si } x \text{ es } \leq 3 \\ 3x^2 + ax - 3 & \text{si } x \text{ es } > 3 \end{cases}$$

$$\lim_{x \rightarrow a^-} = \lim_{x \rightarrow a^+}$$

$$\lim_{x \rightarrow 3^-} 2ax + 1$$

$$\lim_{x \rightarrow 3^+} 3x^2 + ax - 3$$

$$\lim_{x \rightarrow 3^-} 2a(3) + 1$$

$$\lim_{x \rightarrow 3^+} 3(3)^2 + a(3) - 3$$

$$6a + 7$$

$$6a = 6a$$

$$3a$$

$$2a + 3b = 3$$

$$2a + 3b = 1$$

$$2 \cdot 3$$

$$a = \frac{23}{3}$$

$$f(x) = \begin{cases} 3x^2 - 1 & \text{if } x \leq -1 \\ 2ax + 3b & \text{if } -1 < x < 2 \\ 4x + 7 & \text{if } x \geq 2 \end{cases}$$

$$\lim_{x \rightarrow a^-} = \lim_{x \rightarrow a^+}$$

$$\lim_{x \rightarrow -1} 3x^2 - 1$$

$$\lim_{x \rightarrow -1} 2ax + 3b$$

$$\lim_{x \rightarrow -1} 3(-1)^2 - 1$$

$$\lim_{x \rightarrow -1} 2a(-1) + 3b$$

$$\lim_{x \rightarrow -1} 3 - 1$$

$$\lim_{x \rightarrow -1} -2a + 3b$$

$$2$$

$$-2a + 3b$$

$$-2a + 3b$$

$$2$$

$$2a - 3b$$

$$-2$$

$$\lim_{x \rightarrow 2^-} 2ax + 3b$$

$$\lim_{x \rightarrow 2^+} 4x + 7$$

$$2ax + 3b$$

$$4x + 7$$

$$2a(2) + 3b$$

$$4(2) + 7$$

$$\begin{aligned} 4a + 3b &= 8 + 1 \\ 4a + 3b &= -15 \end{aligned}$$

$$\begin{cases} 2a + 3b = -2 \\ 4a + 3b = 15 \end{cases}$$

$$6a = 13$$

$$a = \frac{13}{6}$$

$$2a - 3b = -2$$

$$2\left(\frac{13}{6}\right) - 3b = -2$$

$$\frac{13}{3} - 3b = -2$$

$$-3b = -2 - \frac{13}{3}$$

$$-3b = -\frac{19}{3}$$

$$b = \frac{\frac{19}{3}}{-3} = \frac{19}{-9}$$

$$b = -\frac{19}{9}$$

$$f(x) = \begin{cases} x+1 & \text{si } x \leq -2 \\ x^2+4 & \text{si } -2 < x \leq 1 \\ 2x+3 & \text{si } x > 1 \end{cases}$$

$$\lim_{x \rightarrow a^-} = \lim_{x \rightarrow a^+}$$

$$\begin{aligned} \lim_{x \rightarrow -2} x+1 &= x^2+4 \\ \lim_{x \rightarrow -2} (-2)+1 &= (-2)^2+4 \end{aligned}$$

$$-1 = 8$$

$$\lim_{x \rightarrow 1} x^2 + 4$$

$$(1)^2 + 4$$

$$5 = 5$$

$$\lim_{x \rightarrow 1} 2x + 3$$

$$2(1) + 3$$

La función $x^2 + 4$ es continua con $2x + 3$

$$f(x) = \begin{cases} x + 3 & \text{si } x \leq 1 \\ ax - x^2 & \text{si } x > 1 \end{cases}$$

$$\lim_{x \rightarrow a^-}$$

$$\lim_{x \rightarrow a^+}$$

$$\lim_{x \rightarrow 1} x + 3$$

$$(1) + 3$$

$$4$$

$$4$$

$$\lim_{x \rightarrow 1} ax - x^2$$

$$a(1) - (1)^2$$

$$a - 1$$

$$a - 1$$

$$\begin{cases} a - 1 \\ 4 \end{cases}$$

$$1 = a - 1$$

$$-a = -1 - 4$$

$$-a = -5$$

$$a = 5$$

Ejercicios sobre Incremento

- Calcular el cociente medio de incrementos de:
 $f(x) = 5x^3 - 3x^2 + 6x - 1$ cuando va de 2 a -3

$$\Delta x = x_1 - x_0$$

$$\Delta x = -3 - 2$$

$$\Delta x = -5$$

$$\Delta y = f(x_1) - f(x_0)$$

$$f(x_1) = 5x^3 - 3x^2 + 6x - 1$$

$$f(-3) = 5(-3)^3 - 3(-3)^2 + 6(-3) - 1$$

$$f(-3) = -135 - 27 - 18 - 1$$

$$f(-3) = -181$$

$$f(x_0) = 5x^3 - 3x^2 + 6x - 1$$

$$f(2) = 5(2)^3 - 3(2)^2 + 6(2) - 1$$

$$f(2) = 40 - 12 + 12 - 1$$

$$f(2) = 39$$

$$\Delta y = f(x_1) - f(x_0)$$

$$\Delta y = -181 - 39$$

$$\Delta y = -220$$

$$\frac{\Delta y}{\Delta x} = \frac{-220}{-5}$$

$$\frac{\Delta y}{\Delta x} = 44$$

• Calcular el cociente medio de incrementos de:
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- Calcular el cociente medio de incrementos de $f(x) = 5x^3 - 3x^2 + 6x - 1$ cuando varía de 2 a -3

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• Calcular el cociente medio de incrementos de $f(x)$: $5x^3 - 3x^2 + 6x - 1$ cuando va de 2 a -3

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