"Tugas 2" - 20 Nov' 2024 -

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1/ Tentukan Nilai Limit fungsi berikut:

a/ $\lim_{x \to 3} (7x - 4) = 7(3) - 4$

$= 21 - 4 = 17$ //

b/ $\lim_{u \to 2} \frac{u^2 - 2u}{u^2 - 4} = \lim_{u \to 2} \frac{u(u-2)}{(u-2)(u+2)}$

$= \lim_{u \to 2} \frac{u}{u+2} = \frac{2}{4} = \frac{1}{2}$ //

c/ $\lim_{x \to 0} (4x^2 - 3)(7x^3 + 2x)$

$\Leftrightarrow \lim_{x \to 0} (4x^2 - 3) \cdot \lim_{x \to 0} (7x^3 + 2x)$

$\Leftrightarrow (4(0)^2 - 3)(7(0)^3 + 2(0))$

$\Leftrightarrow (0 - 3)(0) = 0$ //

d/ $\lim_{w \to 2} \frac{(w+2)(w^2 - w - 6)}{w^2 + 4w + 4} = \lim_{w \to 2} \frac{(w+2)(w-3)(w+2)}{(w+2)(w+2)}$

$= \lim_{w \to 2} w - 3$

$= -2 - 3 = -5$ //

2/ a/ $h(t) = \begin{cases} \frac{t^3-8}{t-2}, & t \neq 2 \\ 12, & t = 2 \end{cases}$

(i) $\lim_{t \to 2} \frac{t^3-8}{t-2} = \lim_{t \to 2} \frac{t^3-2^3}{t-2}$

$= \lim_{t \to 2} \frac{(t-2)(t^2+2t+4)}{t-2}$

$= \lim_{t \to 2} t^2+2t+4$

$= (2)^2+2(2)+4 = 12$ (ada)

(ii) $h(2) = 12$ (ada)

∴ karena $\lim_{t \to 2} h(t) = h(2)$ maka h kontinu di $t=2$

b/ $h(t) = \begin{cases} \frac{4t-8}{t-2}, & t \neq 2 \\ 2, & t = 2 \end{cases}$

(i) $\lim_{t \to 2} \frac{4t-8}{t-2} = \lim_{t \to 2} \frac{4(t-2)}{t-2} = \lim_{t \to 2} 4 = 4$ (ada)

(ii) $h(2) = 2$ (ada)

∴ karena $\lim_{t \to 2} h(t) \neq h(2)$ maka h tidak kontinu di $t=2$

2/ c/ $h(t) = \begin{cases} t+3, & t < 2 \\ t^2+1, & t \geq 2 \end{cases}$

(i) $\lim_{t \to 2^-} h(t) = \lim_{t \to 2^-} t+3$
$= 2+3 = 5$ //

$\lim_{t \to 2^+} h(t) = \lim_{t \to 2^+} t^2+1$
$= (2)^2+1 = 5$ //

Karena $\lim_{t \to 2^-} h(t) = \lim_{t \to 2^+} h(t)$ maka $\lim_{t \to 2} h(t) = 5$ //

(ii) $h(2) = t^2+1$
$= (2)^2+1 = 5$ //

∴ Karena $\lim_{t \to 2} h(t) = h(2)$ maka h kontinu di $t = 2$ //

3/ a/ $\lim_{x \to \infty} \frac{4x^2 - 8x + 1}{\sqrt{3x^4 + x^3 + 5}} = \lim_{x \to \infty} \frac{\frac{4x^2}{x^2} - \frac{8x}{x^2} + \frac{1}{x^2}}{\sqrt{\frac{3x^4}{x^4} + \frac{x^3}{x^4} + \frac{5}{x^4}}}$

$= \lim_{x \to \infty} \frac{4 - \frac{8}{x} + \frac{1}{x^2}}{\sqrt{3 + \frac{1}{x} + \frac{5}{x^4}}}$

$= \frac{4 - \frac{8}{\infty} + \frac{1}{\infty^2}}{\sqrt{3 + \frac{1}{\infty} + \frac{5}{\infty^4}}}$

$= \frac{4 - 0 + 0}{\sqrt{3+0+0}} = \frac{4}{\sqrt{3}}$ //

3/ b/ $\lim_{x\to\infty} \frac{7x^5 - x^3 - 4}{2x^3 - x^2 + x + 1} = \lim_{x\to\infty} \frac{\frac{7x^5}{x^5} - \frac{x^3}{x^5} - \frac{4}{x^5}}{\frac{2x^3}{x^3} - \frac{x^2}{x^3} + \frac{x}{x^3} + \frac{1}{x^3}}$

$= \lim_{x\to\infty} \frac{7 - \frac{1}{x^2} - \frac{4}{x^5}}{2 - \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3}}$

$= \frac{7 - \frac{1}{\infty^2} - \frac{4}{\infty^5}}{2 - \frac{1}{\infty} + \frac{1}{\infty^2} + \frac{1}{\infty^3}} = \frac{7 - 0 - 0}{2 - 0 + 0 + 0}$

$= \frac{7}{2}$ //

4/ a/ $g(x) = \begin{cases} 2x + 4, & x < -1 \\ 2 + 2x - x^2, & x \geq 1 \end{cases}$

$\lim_{x\to -1^-} g(x) = \lim_{x\to -1^-} 2x + 4$

$= 2(-1) + 4 = 2$ //

$\lim_{x\to -1^+} g(x) = \lim_{x\to -1^+} 2 + 2x - x^2$

$= 2 + 2(-1) - (-1)^2$

$= 2 - 2 - 1 = -1$ //

Karena $\lim_{x\to -1^-} g(x) \neq \lim_{x\to -1^+}$ maka $\lim_{x\to -1} g(x) =$ tidak ada //

4/b/

$$g(x) = \begin{cases} 2+2x-x^2, & x < 2 \\ 2(x-1), & x \geq 2 \end{cases}$$

$$\lim_{x \to 2^-} g(x) = \lim_{x \to 2^-} 2+2x-x^2$$

$$= 2+2(2)-(2)^2 = 2 //$$

$$\lim_{x \to 2^+} g(x) = \lim_{x \to 2^+} 2(x-1)$$

$$= 2(2-1) = 2 //$$

Karena $\lim_{x \to 2^-} g(x) = \lim_{x \to 2^+}$ maka $\lim_{x \to 2} g(x) = 2 //$