

# Kunci Jawaban Kuis

# Kuis

1. Diketahui  $f(x) = \begin{cases} x^2 - 1, x \leq -1 \\ 2x + 2, x > -1 \end{cases}$

selidiki kekontinuan fungsi  $f(x)$  di  $x = -1$

[20 poin]

2. a  $\lim_{x \rightarrow 2^+} \frac{3}{x^2 - 4}$

b.  $\lim_{x \rightarrow 2^-} \frac{3}{x^2 - 4}$

c.  $\lim_{x \rightarrow 2} \frac{3}{x^2 - 4}$

[15 poin]

3. a  $\lim_{x \rightarrow -\infty} \frac{5x + 7x^4}{4 - x^2}$

b.  $\lim_{x \rightarrow \infty} \frac{10x^3 - 6x}{7x^3 + 9}$

[10 poin]

4. [15 poin]  $\lim_{x \rightarrow 0} \frac{\tan^2 5x}{4x}$

5. [15 poin] Tentukan  $\theta$  pada persamaan berikut dimana  $\theta$  berada di antara  $[0, 2\pi]$ :

$$2 \sin \frac{\theta}{4} = \sqrt{3}$$

6. [10 poin] Tentukan fungsi turunan pertama dari

a.  $f(x) = (x+1)(x^3 + 2x+1)$

b.  $f(x) = \frac{x^2 - 1}{x^2 + 1}$

7. [15 poin] Tentukan domain dan range fungsi berikut  $f(x) = 5 + \sqrt{x}$

$$1. \quad f(x) = \begin{cases} x^2 - 1, & x \leq -1 \\ 2x + 2, & x > -1 \end{cases}$$

$$f(-1) = x^2 - 1 = (-1)^2 - 1 = 0$$

$$\lim_{x \rightarrow -1^-} x^2 - 1 = 0$$

$$\lim_{x \rightarrow -1^+} 2x + 2 = 0$$

Limit kiri sama dengan limit kanan maka

$\lim_{x \rightarrow -1} f(x)$  terdefinisi dan memiliki nilai yang sama yaitu 0

karena  $\lim_{x \rightarrow -1} f(x) = f(-1)$  Maka  $f(x)$  kontinu di titik  $x = -1$

$$2. \text{ a } \lim_{x \rightarrow 2^+} \frac{3}{x^2 - 4} = \infty$$

$$\text{b. } \lim_{x \rightarrow 2^-} \frac{3}{x^2 - 4} = -\infty$$

$$\text{c. } \lim_{x \rightarrow 2} \frac{3}{x^2 - 4} \text{ tidak terdefinisi}$$

3.a)

$$\lim_{x \rightarrow -\infty} \frac{5x + 7x^4}{4 - x^2} = \lim_{x \rightarrow -\infty} \frac{x^2 \left( \frac{5x}{x^2} + \frac{7x^4}{x^2} \right)}{x^2 \left( \frac{4}{x^2} - \frac{x^2}{x^2} \right)} = \lim_{x \rightarrow -\infty} \frac{\frac{5}{x} + 7x^2}{\frac{4}{x^2} - 1} = \frac{0 + \infty}{0 - 1} = -\infty$$

Ralat dari kuliah sebelumnya, pembagi diambil dari pangkat terbesar di penyebut..

$$3.b) \lim_{x \rightarrow \infty} \frac{10x^3 - 6x}{7x^3 + 9} = \lim_{x \rightarrow \infty} \frac{x^3 \left( \frac{10x^3}{x^3} - \frac{6x}{x^3} \right)}{x^3 \left( \frac{7x^3}{x^3} + \frac{9}{x^3} \right)} = \lim_{x \rightarrow \infty} \frac{10 - \frac{6}{x^2}}{7 + \frac{9}{x^3}} = \frac{10 - 0}{7 + 0} = \frac{10}{7}$$

4)

$$\begin{aligned}\lim_{x \rightarrow 0} \frac{\tan^2 5x}{4x} &= \lim_{x \rightarrow 0} \frac{\tan 5x \cdot \tan 5x \cdot \frac{5}{4}}{4x \cdot \frac{5}{4}} = \lim_{x \rightarrow 0} \frac{\tan 5x \cdot \tan 5x \cdot \frac{5}{4}}{5x} \\ &= \lim_{x \rightarrow 0} \frac{\tan 5x}{5x} \cdot \lim_{x \rightarrow 0} \tan 5x \cdot \frac{5}{4} = \lim_{5x \rightarrow 0} \frac{\tan 5x}{5x} \cdot \lim_{x \rightarrow 0} \tan 5x \cdot \frac{5}{4} \\ &= 1 \cdot \lim_{x \rightarrow 0} \tan 5x \cdot \frac{5}{4} = 1 \cdot \frac{5}{4} \cdot \lim_{x \rightarrow 0} \tan 5x = 1 \cdot \frac{5}{4} \cdot 0 = 0\end{aligned}$$

5)

$$2 \sin \frac{\theta}{4} = \sqrt{3}$$

$$\sin \frac{\theta}{4} = \frac{\sqrt{3}}{2}$$

$$\frac{\theta_1}{4} = \frac{\pi}{3}; \frac{\theta_2}{4} = \pi - \frac{\pi}{3} = \frac{2}{3}\pi$$

$$\theta_1 = \frac{4}{3}\pi, \theta_2 = \frac{8}{3}\pi$$

$$\begin{aligned} 6.a) \quad f(x) &= (x+1)(x^3 + 2x+1) \\ &= x^4 + 2x^2 + x + x^3 + 2x+1 \\ &= x^4 + x^3 + 2x^2 + 3x+1 \end{aligned}$$

$$f(x) = 4x^3 + 3x^2 + 4x + 3$$

$$6.b) \quad f(x) = \frac{x^2 - 1}{x^2 + 1}$$

$$u = x^2 - 1$$

$$v = x^2 + 1$$

$$f'(x) = \frac{u'v - v'u}{v^2} = \frac{2x(x^2 + 1) - 2x(x^2 - 1)}{(x^2 + 1)^2} = \frac{2x^3 + 2x - 2x^3 + 2x}{(x^2 + 1)^2}$$

$$= \frac{4x}{(x^2 + 1)^2}$$

$$7) f(x) = 5 + \sqrt{x}$$

Domain :  $[0, \infty)$

Range :  $[5, \infty)$