

MATEMATIKA PEMINATAN

# LIMIT TAK HINGGA FS TRIGONOMETRI

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••• Nama

Kelas

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### Masalah 1

Tentukan nilai dari  $\lim_{x \rightarrow \infty} \frac{x^2 \tan\left(\frac{2}{x}\right) \tan\left(\frac{3}{x}\right)}{3}$



#### Ayo Berdiskusi

Misalkan  $y = \frac{1}{x}$  maka  $x = \dots$

Jika  $x \rightarrow \infty$  maka  $y = \frac{1}{\dots} = \dots$  ( $y \rightarrow \dots$ )

Sehingga  $\lim_{x \rightarrow \infty} \frac{x^2 \tan\left(\frac{2}{x}\right) \tan\left(\frac{3}{x}\right)}{3}$  dapat ditulis menjadi

$$\begin{aligned} \lim_{y \rightarrow \dots} \frac{\dots}{3} &= \lim_{y \rightarrow \dots} \frac{\dots}{3y^2} \\ &= \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \times \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \\ &= \dots \times \dots \\ &= \dots \end{aligned}$$

Jadi, nilai dari  $\lim_{x \rightarrow \infty} \frac{x^2 \tan\left(\frac{2}{x}\right) \tan\left(\frac{3}{x}\right)}{3} = \dots$

### Masalah 2

Lampiran A.2.b

Tentukan nilai dari  $\lim_{x \rightarrow \infty} \frac{\sin^3 \frac{1}{x}}{(1 - \cos^2 \frac{2}{x}) x^2 \sin \frac{1}{x}}$



#### Ayo Berdiskusi

Misalkan  $y = \frac{1}{x}$  maka  $x = \dots$

Jika  $x \rightarrow \infty$  maka  $y = \frac{1}{\dots} = \dots$  ( $y \rightarrow \dots$ )

Sehingga  $\lim_{x \rightarrow \infty} \frac{\sin^3 \frac{1}{x}}{(1 - \cos^2 \frac{2}{x}) x^2 \sin \frac{1}{x}}$  dapat ditulis menjadi

$$\begin{aligned} \lim_{y \rightarrow \dots} \frac{\sin^3 y}{\dots} &= \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \\ &= \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \\ &= \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \times \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \times \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \\ &= \dots \times \dots \times \dots \\ &= \dots \end{aligned}$$

Jadi, nilai dari  $\lim_{x \rightarrow \infty} \frac{\sin^3 \frac{1}{x}}{(1 - \cos^2 \frac{2}{x}) x^2 \sin \frac{1}{x}} = \dots$

### Masalah 3

Tentukan nilai dari  $\lim_{x \rightarrow \infty} \frac{\csc^2\left(\frac{2}{x}\right) - x^3 \sin\left(\frac{4}{x}\right)}{x^2}$



#### Ayo Berdiskusi

Misalkan  $y = \frac{1}{x}$  maka  $x = \dots$

Jika  $x \rightarrow \infty$  maka  $y = \frac{1}{\dots} = \dots$  ( $y \rightarrow \dots$ )

$$\csc y = \frac{1}{\sin y}$$

$$\lim_{x \rightarrow \infty} \frac{\csc^2\left(\frac{2}{x}\right) - x^3 \sin\left(\frac{4}{x}\right)}{x^2} = \lim_{x \rightarrow \infty} \frac{\dots}{x^2} - \lim_{x \rightarrow \infty} \frac{\dots}{x^2}$$

$$\begin{aligned} \lim_{x \rightarrow \infty} \frac{\csc^2\left(\frac{2}{x}\right) - x^3 \sin\left(\frac{4}{x}\right)}{x^2} &= \lim_{y \rightarrow \dots} \frac{\dots}{\left(\frac{1}{y}\right)^2} - \lim_{y \rightarrow \dots} \frac{\dots}{\left(\frac{1}{y}\right)^2} \\ &= \lim_{y \rightarrow \dots} \frac{\dots}{\dots} - \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \\ &= \left( \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \times \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \right) - \left( \lim_{y \rightarrow \dots} \frac{\dots}{\dots} \right) \\ &= (\dots \times \dots) - \dots \\ &= \dots \end{aligned}$$

$$\text{Jadi, nilai dari } \lim_{x \rightarrow \infty} \frac{\csc^2\left(\frac{2}{x}\right) - x^3 \sin\left(\frac{4}{x}\right)}{x^2} = \dots$$

Kerjakan soal dibawah ini, dengan mengisi jawaban pada tempat yang tersedia!

$$1) \lim_{x \rightarrow \infty} \frac{\operatorname{ctg} \frac{1}{2x}}{\operatorname{cosec} \frac{1}{5x}} = \frac{\dots}{\dots}$$

$$2) \lim_{x \rightarrow \infty} \operatorname{ctg} \frac{4}{x} \cdot \sin \frac{1}{x} = \frac{\dots}{\dots}$$

$$3) \lim_{x \rightarrow \infty} \frac{\operatorname{ctg} \frac{1}{3x}}{\operatorname{cosec} \frac{1}{x}} = \dots$$

$$4) \lim_{x \rightarrow \infty} \frac{1 - \cos \frac{4}{x}}{\frac{2}{x} \cdot \operatorname{tg} \frac{3}{x}} = \frac{\dots}{\dots}$$

$$5) \lim_{x \rightarrow \infty} \frac{2x \cdot \operatorname{ctg} \frac{2}{x} - 3 \cdot \operatorname{ctg} \frac{2}{x}}{6x^2 - 9x} = \frac{\dots}{\dots}$$

$$6) \lim_{x \rightarrow \infty} \frac{x \cdot (\cos \frac{6}{x} + \cos \frac{2}{x})}{\sin \frac{2}{x}} = \dots$$