

Tugas MATP

$$\begin{aligned} 1.) \text{ Nilai lim } \frac{\sin 4x}{\tan(-5x)} &= \lim_{x \rightarrow 0} \frac{\frac{d}{dx} (\sin(4x))}{\frac{d}{dx} (\tan(-5))} \\ &= \lim_{x \rightarrow 0} \frac{4 \cos(4x)}{-5 \sec^2(-5x)} \\ &= \frac{4 \cdot \cos(4 \cdot (0))}{-5 \cdot \sec^2(-5 \cdot (0))} \\ &= \frac{4 \cdot \cos(0)}{-5 \cdot \sec^2(0)} \\ &= \frac{4 \cdot 1}{-5 \cdot 1} = \frac{4}{-5} \end{aligned}$$

$$\begin{aligned} 2.) \text{ Nilai lim } \frac{\sin 7x}{3x - \tan 2x} &= \lim_{x \rightarrow 0} \frac{7 \cos 7x}{3 - 2 \sec^2 2x} \\ &= \frac{7 \cdot \cos(0)}{3 - 2 \cdot \sec^2(0)} = \frac{7 \cdot 1}{3 - 2 \cdot 1} = \frac{7}{3 - 2} = \frac{7}{1} = 7 \end{aligned}$$

$$\begin{aligned} 3.) \text{ Nilai lim } \frac{\sin 4x + \sin 6x}{\sin 2x} &= \lim_{x \rightarrow 0} \frac{\sin 4x}{\sin 2x} + \frac{\sin 6x}{\sin 2x} \\ &= \frac{4}{2} + \frac{6}{2} = \frac{10}{2} = 5 \end{aligned}$$

$$\begin{aligned}
 4.) \text{ Nilai lim } \lim_{x \rightarrow 1} \frac{(x^2 - 1) \sin 2(x-1)}{-2 \sin^2(x-1)} &= \lim_{x \rightarrow 1} \frac{(x-1)(x+1) \sin 2(x-1)}{-2 \sin(x-1) \sin(x-1)} \\
 &= \lim_{x \rightarrow 1} \frac{(x+1)}{-2} \cdot \frac{(x-1)}{\sin(x-1)} \cdot \frac{\sin 2(x-1)}{(x-1)} \\
 &= \frac{(1+1)}{-2} \cdot 1 \cdot 2 = \frac{2}{-2} \cdot 2 = -2 //
 \end{aligned}$$

5.) Nilai lim $(\pi - 2x) \tan x$

$$x \rightarrow \frac{\pi}{2}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} (\pi - 2x) \frac{\sin x}{\cos x}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} \sin x \cdot \frac{(\pi - 2x)}{\cos x}$$

$$\begin{array}{cc}
 \lim_{x \rightarrow \frac{\pi}{2}} \sin x & \lim_{x \rightarrow \frac{\pi}{2}} \frac{\pi - 2x}{\cos x} \\
 \underbrace{\hspace{10em}}_1 & \underbrace{\hspace{10em}}_{\frac{0}{0}}
 \end{array}$$

$$= 1 \cdot \lim_{x \rightarrow \frac{\pi}{2}} \frac{-2}{-\sin x}$$

$$= 1 \cdot \lim_{x \rightarrow \frac{\pi}{2}} \frac{2}{\sin x}$$

$$= 1 \cdot \frac{2}{1} = 2 //$$