Tugas MATP

1.) Nilai $\lim\limits_{x \to 0} \dfrac{\sin 4x}{\tan(-5x)} = \lim\limits_{x \to 0} \dfrac{\frac{d}{dx}(\sin(4x))}{\frac{d}{dx}(\tan(-5))}$

$$= \lim_{x \to 0} \frac{4\cos(4x)}{-5\sec^2(-5x)}$$

$$= \frac{4 \cdot \cos(4 \cdot (0))}{-5 \cdot \sec^2(-5 \cdot (0))}$$

$$= \frac{4 \cdot \cos(0)}{-5 \cdot \sec^2(0)}$$

$$= \frac{4 \cdot 1}{-5 \cdot 1} = \frac{4}{-5}$$

2.) Nilai $\lim\limits_{x \to 0} \dfrac{\sin 7x}{3x - \tan 2x} = \lim\limits_{x \to 0} \dfrac{7\cos 7x}{3 - 2\sec^2 2x}$

$$= \frac{7 \cdot \cos(0)}{3 - 2 \cdot \sec^2(0)} = \frac{7 \cdot 1}{3 - 2 \cdot 1} = \frac{7}{3 - 2} = \frac{7}{1} = 7$$

3.) Nilai $\lim\limits_{x \to 0} \dfrac{\sin 4x + \sin 6x}{\sin 2x} = \lim\limits_{x \to 0} \dfrac{\sin 4x}{\sin 2x} + \dfrac{\sin 6x}{\sin 2x}$

$$= \frac{4}{2} + \frac{6}{2} = \frac{10}{2} = 5$$

4.) Nilai $\lim\limits_{x \to 1} \dfrac{(x^2-1)\sin 2(x-1)}{-2\sin^2(x-1)} = \lim\limits_{x \to 1} \dfrac{(x-1)(x+1)\sin 2(x-1)}{-2\sin(x-1)\sin(x-1)}$

$$= \lim\limits_{x \to 1} \frac{(x+1)}{-2} \cdot \frac{(x-1)}{\sin(x-1)} \cdot \frac{\sin 2(x-1)}{(x-1)}$$

$$= \frac{(1+1)}{-2} \cdot 1 \cdot 2 = \frac{2}{-2} \cdot 2 = -2 \;//$$

5.) Nilai $\lim\limits_{x \to \frac{\pi}{2}} (\pi - 2x)\tan x$

$$= \lim\limits_{x \to \frac{\pi}{2}} (\pi - 2x)\frac{\sin x}{\cos x}$$

$$= \lim\limits_{x \to \frac{\pi}{2}} \sin x \cdot \frac{(\pi - 2x)}{\cos x}$$

$$= \underbrace{\lim\limits_{x \to \frac{\pi}{2}} \sin x}_{1} \quad \underbrace{\lim\limits_{x \to \frac{\pi}{2}} \frac{\pi - 2x}{\cos x}}_{\xrightarrow{} \frac{0}{0}}$$

$$= 1 \cdot \lim\limits_{x \to \frac{\pi}{2}} \frac{-2}{-\sin x}$$

$$= 1 \cdot \lim\limits_{x \to \frac{\pi}{2}} \frac{2}{\sin x}$$

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