

Answer key for the Trig Limit W.S

$$\# 1. \lim_{x \rightarrow 0^+} \frac{\sin x \cdot \sqrt{x}}{\sqrt{x} \cdot \sqrt{x}} = \lim_{x \rightarrow 0^+} \frac{\sin x}{x} \cdot \sqrt{x} = 1 \cdot 0 = \boxed{0}$$

$$\# 2. \lim_{x \rightarrow 0} \frac{\sin 2x}{x} = \lim_{x \rightarrow 0} \frac{\sin 2x}{2x} \cdot \frac{2}{1} = 1 \cdot 2 = \boxed{2}$$

$$\# 3. \lim_{x \rightarrow 0} \frac{\sin 2x}{5x} = \lim_{x \rightarrow 0} \left(\frac{\sin 2x}{2x} \right) \left(\frac{2x}{5x} \right) = 1 \cdot \frac{2}{5} = \boxed{\frac{2}{5}}$$

$$\# 4. \lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin x} \cdot \frac{(1 + \cos x)}{(1 + \cos x)} = \lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{\sin x (1 + \cos x)}$$

$$= \lim_{x \rightarrow 0} \frac{\sin^2 x}{\sin x (1 + \cos x)} = \lim_{x \rightarrow 0} \frac{\sin x}{1 + \cos x} = \frac{0}{2} = \boxed{0}$$

$$\# 5. \lim_{\theta \rightarrow 0} \frac{\cos \theta \cdot \tan \theta}{\theta} = \lim_{\theta \rightarrow 0} \frac{\cos \theta \cdot \frac{\sin \theta}{\cos \theta}}{\theta} = \lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = \boxed{1}$$

$$\# 6. \lim_{t \rightarrow 0} \frac{\tan 2t}{\tan 5t} = \lim_{t \rightarrow 0} \left(\frac{\sin 2t}{\cos 2t} \right) \left(\frac{\cos 5t}{\sin 5t} \right)$$

$$= \lim_{t \rightarrow 0} \left(\frac{\sin 2t}{5t} \right) \left(\frac{2t}{\sin 2t} \right) \left(\frac{5}{2} \right) \left(\frac{\cos 5t}{\cos 5t} \right) = 1 \cdot 1 \cdot \frac{5}{2} \cdot 1 = \boxed{\frac{5}{2}}$$

$$\# 7. \lim_{t \rightarrow \frac{\pi}{2}} \frac{\cos t}{\cot t} = \lim_{t \rightarrow \frac{\pi}{2}} (\cos t) \left(\frac{\sin t}{\cos t} \right) = \sin \left(\frac{\pi}{2} \right) = \boxed{1}$$

$$\# 8. \lim_{x \rightarrow 0} \frac{3(1 - \cos x)(1 + \cos x)}{x(1 + \cos x)} = \lim_{x \rightarrow 0} \frac{3(1 - \cos^2 x)}{x} = \lim_{x \rightarrow 0} \frac{3 \sin^2 x}{x} = 3 \cdot 0 = \boxed{0}$$