

**Instructions:** Show all work and simplify your answers! Correct answers without work will receive zero points. Also, points will be taken from messy solutions. **Good Luck!** ☺

Evaluate the following limits.

$$\begin{aligned} 1. \lim_{x \rightarrow 0} \frac{\sin(3x)}{2x} &= \lim_{x \rightarrow 0} \frac{\sin(3x)}{2x} \cdot \frac{3}{3} \\ &= \lim_{x \rightarrow 0} \frac{3 \sin(3x)}{2(3x)} \\ &= \frac{3}{2} \lim_{x \rightarrow 0} \frac{\sin(3x)}{3x} \\ &= \frac{3}{2} \cdot 1 \\ &= \frac{3}{2} \end{aligned}$$

$$\begin{aligned} 2. \lim_{x \rightarrow 0} \frac{\sin(2x)(1 - \cos x)}{x^2} &= \left( \lim_{x \rightarrow 0} \frac{\sin(2x)}{x} \right) \left( \lim_{x \rightarrow 0} \frac{1 - \cos x}{x} \right) \\ &= \left( \lim_{x \rightarrow 0} \frac{2 \sin(2x)}{2x} \right) \cdot 0 \\ &= 2 \cdot 0 \\ &= 0 \end{aligned}$$

Quiz 3

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$$\begin{aligned} 3. \lim_{x \rightarrow \infty} \frac{x^2 - 2x}{x^2 - 4} &= \lim_{x \rightarrow \infty} \frac{x^2 - 2x}{x^2 - 4} \cdot \frac{\frac{1}{x^2}}{\frac{1}{x^2}} \\ &= \lim_{x \rightarrow \infty} \frac{1 - \frac{2}{x}}{1 - \frac{4}{x^2}} \\ &= \frac{1 - 0}{1 - 0} \\ &= 1 \end{aligned}$$

$$\begin{aligned} 4. \lim_{x \rightarrow -\infty} \frac{\sqrt{36x^2 + 7}}{2x + 4} &= \lim_{x \rightarrow -\infty} \frac{\sqrt{36x^2 + 7}}{2x + 4} \cdot \frac{\frac{1}{|x|}}{\frac{1}{|x|}} \\ &= \lim_{x \rightarrow -\infty} \frac{\sqrt{36 + \frac{7}{x^2}}}{-2 + \frac{4}{|x|}} \\ &= \frac{\lim_{x \rightarrow -\infty} \sqrt{36 + \frac{7}{x^2}}}{\lim_{x \rightarrow -\infty} -2 + \frac{4}{|x|}} \\ &= \frac{\sqrt{36}}{-2} \\ &= \frac{6}{-2} \\ &= -3 \end{aligned}$$