Name D: **Math 221 Quiz 4** Section_____ Score_____/10

Instructions.
Please make sure to SHOW YOUR WORK, and do not skip steps.

1. *(4 points)* $\lim_{x\to 0} \frac{\sin(3x^2)}{5x^2}$

$$= \lim_{x\to 0} \frac{\sin(3x^2)}{3x^2} \quad \frac{3x^2}{5x^2}$$

$$= \frac{3}{5}$$

2. *(4 points)* $\lim_{x\to 0} \frac{x+\sin(2x)}{\sin(3x)}$

$$= \lim_{x\to 0} \frac{x}{\sin(3x)} + \lim_{x\to 0} \frac{\sin(2x)}{\sin(3x)}$$

$$= \lim_{x\to 0} \frac{3x}{\sin(3x)} \frac{1}{3} + \lim_{x\to 0} \frac{\sin(2x)}{2x} \frac{3x}{\sin(3x)} \frac{2x}{3x}$$

$$= \frac{1}{3} + \frac{2}{3}$$

$$= 1$$

3. *(2 points)* $\lim_{x\to 0} x^2 \sin\left(\frac{1}{x^2}\right)$.

$$-1 \le \sin\left(\frac{1}{x^2}\right) \le 1$$

$$-x^2 \le x^2 \sin\left(\frac{1}{x^2}\right) \le x^2$$

$$?=0 \text{ by sandwich theorem.}$$

[Because when $x\to 0$, $\frac{1}{x^2}$ does not approach 0! match angle will not work. — angle]