KFUPM, DEPARTMENT OF MATHEMATICS AND STATISTICS

MATH 101: QUIZ 2, SEMESTER (141), OCTOBER 14, 2014

Name : ....

ID : ..... Section : 30

Exercise	**Points**
1	$\frac{\quad}{2}$
2	$\frac{\quad}{2}$
3	$\frac{\quad}{2}$
4	$\frac{\quad}{2}$
5	$\frac{\quad}{2}$
Total	$\frac{\quad}{10}$

Exercise 1. Let $f(x) = \begin{cases} x^3 \sin(\frac{1}{x}) & \text{if} \quad x < 0 \\ \\ \sqrt{x} & \text{if} \quad x \geq 0 \end{cases}$

Find $\lim\limits_{x \longrightarrow 0^+} f(x)$, $\lim\limits_{x \longrightarrow 0^-} f(x)$. Does $\lim\limits_{x \longrightarrow 0} f(x)$ exist?

Exercise 2. Find the following limits

(a) $\lim_{x \longrightarrow 0}[(\sin x)(\cot(2x))]$

(b) $\lim_{x \longrightarrow 0} \dfrac{\tan(3x)}{\sin(8x)}$

(c) $\lim_{x \longrightarrow 0} \dfrac{\sin(3x)}{4x}$

Exercise 3. Define $g(3)$ in a way that extends $g(x) = \dfrac{x^2 - 9}{x^2 - 5x + 6}$ to be continuous at 3.

Exercise 4. For what values of a is

$$f(x) = \begin{cases} x^2 - a^2 & \text{if} \quad x < 3 \\ \\ \frac{8}{3}ax & \text{if} \quad x \geq 3 \end{cases}$$

continuous at every x?

Exercise 5. Use the intermediate value theorem to show that the graphs of the functions $f(x) = x^2$ and $g(x) = e^x$ intersect at a point whose x-coordinate lies in the interval $[-1, 0]$.