Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih Math 101- Q2 Date: 2-3-2014

Problem 1: (8 points) If it exists, find the limit. Use the symbols ∞ *or* $-\infty$ as appropriate.

(a) $\lim_{x\to 0} \dfrac{\sin(\sin x)}{\sin x}$

(b) $\lim_{x\to\infty} e^{\frac{1}{x}} \cos\dfrac{1}{x}$

Problem 2: **(**4 points**)** If $f(x) = x^3 - x^2 + x$ show that there is a number *c* such that $f(c) = 15$.
(What is the name of the Theorem you used here?)

Problem 3: **(**8 points**)** Where is the function continuous?

(a) $y = \dfrac{x - \ln x}{\sqrt{3-x}}$

(b) $y = \ln(1+\cos x)$

Problem 4: **(**5 points**)** Find all asymptotes of the function: $y = \dfrac{x^2 - 1}{x+1}$