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

Instructor: M. Z. Abu-Sbeih Math 101- Q2 Date: 23-10-2016

SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERES WITHOUT JUSTIFICATIONS

1. (5 points) Find where the function is continuous: $f(x)=\dfrac{\sqrt{1-x}}{x^2+x-2}$

2. (6 points) Find all values of *a* and *b* which make the function continuous.

$$f(x)=\begin{cases}1+a\sin x+b\cos x & \text{if } x<0\\ ax^2+bx-1 & \text{if } 0\le x\le 1\\ x-a & \text{if } 1<x\end{cases}$$

3. (7 points) Use the $\in-\delta$ definition of limit to show that $\lim\limits_{x\to 2}(1-3x)=-5$.

   Find a values of δ which corresponds to $\in=0.06$

4. (6 points) Use the Intermediate Value Theorem to show that the equation $x^2 - \cos \pi x = 4$ has a solution between $x = 2$ and $x = 3$.

5. (6 points) Find all vertical and horizontal asymptotes of the function $f(x) = \dfrac{\sqrt{2x^2 - 1}}{x - 2}$

6. (10 points) Consider the function $f(x) = \dfrac{1}{x-1}$

   (a) Use the definition of the derivative to find $f'(a)$

   (b) Use part (a) to find the rate of change of the unction at $x = 2$.

   (c) Use part (a) to find the slope of the tangent line to the curve at $x = 2$.

   (d) Find the equation of the line tangent to the curve $(2,1)$.