National University of Computer & Emerging Sciences, Karachi
Department of Computer Science
Assignment 1

Course: Calculus and Analytical Geometry	Course Code: MT 1003
Semester: Spring Section: BCS 1E/F/H	Instructor Name: Shahid Ashraf

1. Find the domain and the range of the function f which is defined by

   (a) $f(x) = \sqrt{4 - \sqrt{x}}$

   (b) $\dfrac{2 - 3x}{7 - 2x}$

2. Show that the function $f : (0, 1) \to (0, 2)$ is one-one in the case that

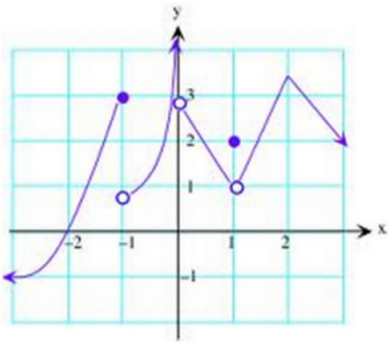
$$\frac{4x}{3 - x}$$

3. (a) Identify the values where the function is discontinuous.

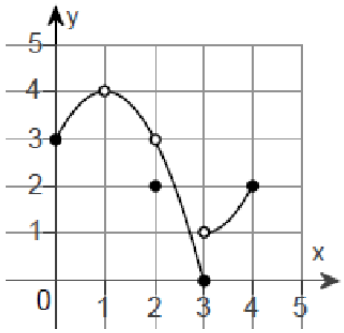
   (b) For each discontinuity, explain clearly (by showing the specific part of the definition of continuity that fails) why the function is not continuous at these points.

   (c) Determine the intervals on which the graph is continuous

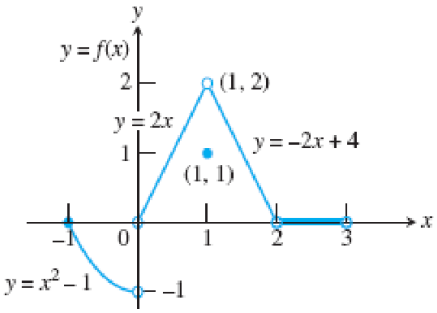
   (d) only for figure 3 write the piecewise function for the graph.



(a) Figure 1



(b) Figure 2



(c) Figure 3

4. For which values of a, b is the function f continuous at the point x = 3? Explain.

$$f(x) = \begin{cases} 4x^2 + ax + b & \text{if } x < 3 \\ a + b - 2 & \text{if } x = 3 \\ 2x^3 - bx + a & \text{if } x > 3 \end{cases}$$

5. Compute the limit of following functions

$a)\ L = \lim\limits_{x \to +\infty} \dfrac{2x^4 - 4x^2 + 5}{3x^4 - 7x + 2}$ $b)\ M = \lim\limits_{x \to 3^-} \dfrac{x^3 - 5x + 4}{x^3 - 8x - 3}$ $c)\ M = \lim\limits_{x \to 1} \dfrac{3x^3 - 7x^2 + 6x - 2}{x - 1}$