United International University
School of Science and Engineering
Mid-term Examination Trimester: Fall 2019
Course Title: Fundamental Calculus (CSE)
Course Code: Math 1151 Marks: 30 Time: 1hr 45 min

Answer all questions.

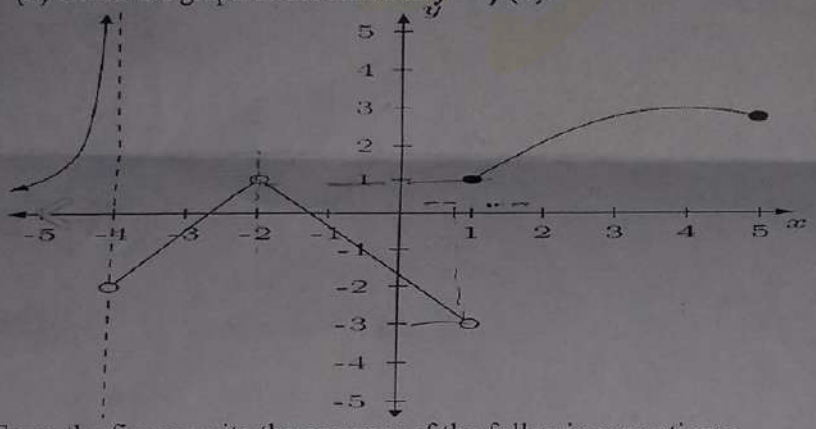
1. Draw the graph of the following functions and find their domain and range. [10]

   (a) $y = 4 - \sqrt{2 - x}$
   (b) $y = -(x - 5)^2 + 1$
   (c) $y = \frac{1}{2-x} - 1$
   (d) $y = -|x - 1| - 4$

2. (a) Determine whether following functions are one to one, **or** many to one. Find the inverse of each functions (if possible). [4]

   i) $f(x) = (1 - x)^3$ ii) $f(x) = 1 - 10^x$

   (b) Given the graph of the function $y = f(x)$. [3]



From the figure write the answers of the following questions:

(i) $lim_{x \to 1} f(x)$
(ii) $lim_{x \to -2} f(x)$
(iii) $f(-2),\ f(1)$

(c) Show that $y = 3 + |x|$ is continuous at $x = 0$. [3]

3. (a) Consider a function $f(x) = x^2 + 2x + 1$ [8]

   i) Find the slope at $x = x_0$ of the given function.
   ii) Find the equation of tangent line to the graph of function at $x = 1$.
   iii) Find the average rate of change of function in the interval $[-1, 1]$
   iv) Draw the graph of $f(x)$ with tangent line at $x = 1$.

   (b) In each part, classify the function as even, odd, or neither [2]

   i) $y = \sqrt[3]{x - 1}$ ii) $y = \frac{1}{x}$