United International University
School of Science and Engineering
Mid-term Examination Trimester: Summer 2019
Course Title: Differential and Integral Calculus (CSE)
Course Code: Math 151 Marks: 30 Time: 1hr 45 min

Answer all questions.

1. Draw the graph of the following functions and find their domain and range. [2*5=10]

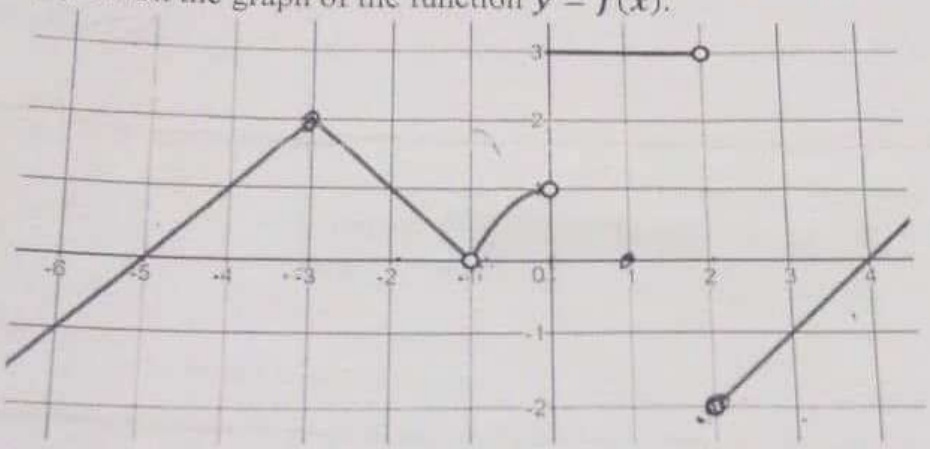
(a) $y = -1 - \sqrt[3]{x+1}$
(b) $y = 3 - \sqrt{1-x}$
(c) $y = -(x+1)^2 + 1$
(d) $y = \frac{1}{x-1} + 3$
(e) $y = -|x+1| - 2$

2. (a) Determine whether following functions are one to one, **or** many to one. [4]

Find the inverse of each function (if possible).

i) $f(x) = \sqrt[3]{1-x}$ ii) $f(x) = -x + 2$

(b) Given the graph of the function $y = f(x)$. [6]



From the figure write the answers of the following questions:

(i) $lim_{x \to 0} f(x)$ → DNE
(ii) $lim_{x \to -1} f(x)$ → 0
(iii) $lim_{x \to -2} f(x)$ → 1
(iv) $f(-3)$, $f(1)$ → 2, 3
(v) Is the function continuous at $x = -5$ and 2? Explain. → C, NotC

(a) Consider a function $f(x) = x^2 + 3$ [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 $x = 2$.
iii) Find the average rate of change of function in the interval $[-1, 2]$
iv) Draw the graph of $f(x)$ with tangent line at $x = 2$.

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

i) $y = |1 - x|$ ii) $y = \frac{1}{x}$ iii) $y = x^3$ iv) $y = x^2 - 2$

odd odd even