

United International University School of Science and Engineering

Mid-term Examination Trimester: summer 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 also find their domain and range.

[10]

(i)
$$y = \sqrt{\frac{x^2 - 9}{x + 3}}$$

(ii)
$$y = 4 + \sqrt{2 - x}$$

(iii)
$$y = \frac{x}{x-1}$$

(iv)
$$y = 3 - |2x - 1|$$

Determine whether the following functions are one to one or many to one. Find the inverse of each function (if possible) and plot them in the same graph:

(i)
$$f(x) = 1 - (x - 1)^2$$

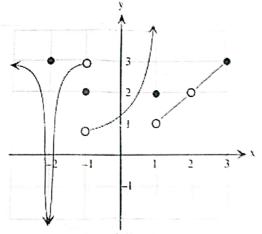
(ii)
$$f(x) = \sqrt[3]{x-2} + 2$$

3. (a) Show that y = -3 + |x - 1| is continuous at x = 1.

[2]

(b) Given the graph of the function y = f(x).

[6]



From the figure write the answers of the following questions:

- (i) $\lim_{x\to -2} f(x)$
- (ii) $\lim_{x\to 1} f(x)$
- (iii) $\lim_{x\to 2} f(x)$
- (iv) Is the function continuous at x = -1 and x = 2? Explain your answer.
- (v) Find f(-2) and f(2).

[6]

- 3. Consider a function $f(x) = -\frac{1}{x}$ for the following:
 - (i) Use the definition to 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) Sketch the graph of f(x) along with the tangent line found above.