



FACULTY OF ENGINEERING, SCIENCES AND TECHNOLOGY

Subject: Calculus & Analytical Geometry

Instructor: Engr. M. Amin Qureshi

Marks: 10

Assignment# 1

Q1: If $f(x) = x^2 - 4x + 6$

Find:

- a) $f(0)$
- b) $f(3)$
- c) $f(-2)$
- d) $f(4)$

Q2: If $f(x) = \frac{x-1}{x+1}$

Find:

- a) $f(0)$
- b) $f(-1)$
- c) $f(-4)$
- d) $f(8)$

Also show that $f(1/x) = -f(x)$ and $f(-1/x) = -1/f(x)$

Q3: Determine the domain of each of the following functions:

a) $y = x^2 + 4$

b) $y = \sqrt{x^2 + 4}$

c) $y = \sqrt{x^2 - 4}$

d) $y = \frac{x}{x+3}$

e) $y = \frac{2x}{(x-2)(x+1)}$

f) $y = \frac{1}{\sqrt{9-x^2}}$

g) $y = \frac{x^2 - 1}{x^2 + 1}$

Q4: Draw the graph of the following functions for $-5 \leq x \leq 5$:

- a) $f(x) = -x^2 + 1$
- b) $f(x) = 5 - x^2$
- c) $f(x) = -4\sqrt{x}$
- d) $f(x) = |x - 3|$

Q5: Calculate the Limit of the following function:

$$\lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{x^2 + x - 6}$$

You are required to solve Q5 using both the methods that were discussed in the class.

- 1) Factorize the denominator and cancel the function that is causing a Zero.
- 2) Calculate one-sided limits to find if the limit exists.

Q6: Whether the function is even, odd, or neither. Give reasons for your answer.

- a) $f(x) = x^2 + 1$
- b) $f(x) = x^3 + x$
- c) $g(x) = \frac{1}{x^2 - 1}$
- d) $h(t) = 2t + 1$