



**FACULTY OF ENGINEERING, SCIENCES AND TECHNOLOGY**

**Subject: Calculus & Analytical Geometry**  
**Marks: 10**

**Instructor: Engr. M. Amin Qureshi**

**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)  $h(t) = 2t + 1$