

**MAT 101:** Differential and Integral Calculus (Sec-4)  
Department of Computer Science and Engineering  
University of Liberal Arts Bangladesh

**Course Title:** Differential and Integral Calculus  
**Total Marks:** 20

**Course Code:** MAT 101  
**Time:** 50 minutes

**Name:** \_\_\_\_\_ **ID:** \_\_\_\_\_

1. In each part, classify the function as even, odd, or neither.

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a)  $f(x) = x^2$

b)  $f(x) = \frac{x^5 - x}{1 + x^2}$

2. Find the limits.

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a)  $\lim_{x \rightarrow +\infty} (\sqrt{x^2 - 3x} - x)$

b) Let

$$f(x) = \begin{cases} x - 2, & x < 0 \\ x^2, & 0 \leq x \leq 2 \end{cases}$$

Find  $\lim_{x \rightarrow 0} f(x)$

3. Consider the functions

$$f(x) = \begin{cases} 1, & x \neq 4 \\ -1, & x = 4 \end{cases} \text{ and } g(x) = \begin{cases} 4x - 10, & x \neq 4 \\ -6, & x = 4 \end{cases}$$

In each part, is the given function continuous at  $x = 4$ ?

a)  $g(f(x))$

b)  $g(x) - 6f(x)$