BRAC UNIVERSITY
Department of Computer Science and Engineering

Quiz 04 **Duration: 25 min**
Semester: Summer 2024 **Full Marks: 15**

Name:	**ID:**	**Section:**

CSE 330: Numerical Methods

1. **[CO3]** The following Data set is generated by the function $\mathbf{f(x) = x^3 + 3x^2 - 4x - 12}$

   (a) (4+6 marks) Show that $\mathbf{g_1(x)} = \frac{x^3+3(x^2+3x-4)}{13}$ can be derived from the given **f(x).** Find the actual roots of **f(x)** and use contraction mapping theorem to find convergence rate for given $\mathbf{g_1(x)}$**,** also state that which root is converging and which one is diverging

   (b) (5 marks) Let $\mathbf{x_0 = 0}$ and $\mathbf{e = 0.001}$, find solution of **f(x)=0** up to 2 iterations for using Newton's method, keep up to **three significant figures**