

DEPARTMENT OF MATHEMATICS
COMSATS Institute of Information Technology, Attock

Quiz/Assignment # 3

Class: MS: Sem. I

Max. Marks: 10

Course Title: Fixed Point Theory and Applications

Course Code: MTH604

Instructor: Dr. Atiq ur Rehman

Dated: 27-03-2018

Question 1: Find fixed point of $f(x) = x^2 - x + 1$

Question 2: Find nature of the fixed point of $f(x) = x^2 - x + 1$

Question 3: Consider a function $g(x) = 2x - 2x^2$, find fixed points and nature of fixed points.

Question 4: If $d(F^n(x), F^{n+1}(x)) \leq Ld(F^{n-1}(x), F^n(x))$ for all $n \in \{0, 1, 2, \dots\}$ and $L < 1$, then show that

$$d(F^n(x), F^m(x)) \leq \frac{L^n}{1-L} d(x, F(x)) \quad \forall m > n.$$

Question 5: Use any software to draw the graph of the function. Draw the orbit by considering x_0 as initial point.

- i. $\cos x$ in interval $[-\frac{\pi}{2}, \frac{\pi}{2}]$, $x_0 = 0.7$.
- ii. $(x + 1) \cos x$ in interval $[-\pi, \pi]$, $x_0 = -0.1$.



Course page: www.mathcity.org/atiq/sp18-mth604

Academic Honesty Requirements:

You are encouraged to work with others in the completion of assignments but it does not include copying. However, in the spirit of Academic Honesty, which includes crediting others for their contribution to your work, please include one of the following statements with every submitted assignment on title page:

1. I worked alone on this assignment.
2. I worked with the following: List their full names. Include their relationship to you if they are not also a member of this class.

Two assignment may get zero credit in case of copying.