UNITY UNIVERSITY

FACULITY OF TECHNOLOGY

Department of Computer Science

Mathematics for Natural Science (Group Assignment)

Show all the necessarily steps clearly and neatly

1. Define each logical connective and construct their truth table.
2. Define the concepts (The set of natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers and complex numbers).
3. Give example and define conjugate, module, additive inverse, multiplicative inverse, argument and principal argument of complex numbers.
4. Prove the following properties;
   a. $Z + \overline{Z} = 2(\frac{Z+\overline{Z}}{2})$ and $\overline{\left(\frac{Z_1}{Z_2}\right)} = \frac{\overline{Z_1}}{\overline{Z_2}}$
   b. $|Z_1 + Z_2| \leq |Z_1| + |Z_2|$ and $\left|\frac{Z_1}{Z_2}\right| = \frac{|Z_1|}{|Z_2|}$.
5. Discuss the difference between Cartesian product, relation and function with examples and determine the domain, range, codomain and inverse for your examples.
6. Write the notions of algebraic expressions, equations, inequalities, linear equations/inequalities, quadratic equations/inequalities and give examples for each.
7. Discuss the difference between real valued functions, real functions and vector valued functions and give example for each.
8. Explain and sketch the graph for elementary functions and give examples.
9. Define the basic properties of logarithmic, exponential and trigonometric functions and their relationships with examples.
10. Prove equations that represent straight lines, circles, parabolas, ellipses and hyperbola and give example for each.

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