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6. Which of the following is a **proposition**?

   (a) x is divisible by 2.

   (b) Thank you!

   (c) For any real number x, $x^2 \geq 0$.

   (d) $x + 1 = 5$

   (e) None.

Part II. Short Answer Questions (12%)

Instruction: Write the most simplified answer on the space provided.(1.5 pts each)

7. Let p : Abebe attends class regularly and q : Abebe pass the exam. Write the symbolic form of the sentence "**Abebe attends class regularly but he fail the exam.**" _____

8. Suppose the truth values of p, q and r are T, F and T respectively. Then, the truth value of $(\neg p \vee q) \Rightarrow [q \Leftrightarrow (p \wedge r)]$ is ____.

9. Given set $A = \left\{\frac{4+3n}{1+n}\right\}$ for $n \in \mathbb{N}$.

   (a) lub of A = ____

   (b) glb of A = ____

10. The fraction form of $0.3\overline{13}$ is _____

11. Let $z = -\sqrt{3} - i$. Then

    (a) $\text{Arg}(z)$ = _____.

    (b) z^{60} = _____ (in rectangular form)

12. Let U = {1, 2, 3, 4, 5, 6, 7} be the universal set and let A = {1, 2, 3, 4, 5} and B = {2, 3, 6, 7}. Then A△(A − B) = _____.

Part III. Workout Problems (12%)

Show all the necessary steps clearly on the space provided.

13. Using Principle of Mathematical Induction, show that $n^2 - n$ is divisible by 3, for $n \geq 2$. (4 pts.)

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14. By using truth table determine whether the compound proposition

$$(p \Rightarrow q) \wedge (q \Rightarrow r)$$

is a tautology, a contradiction or neither. **(4 pts.)**

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15. Find cubic roots of $-2 + \sqrt{12}i$. (4 pts.)

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