

1. WHAT IS THE NEGATION OF THE FOLLOWING STATEMENT?
DO YOU THINK THE ORIGINAL STATEMENT OR ITS
NEGATION IS THE TRUE ONE?

$$\forall x \in \mathbb{Q}, \forall \epsilon > 0, \exists y \in \mathbb{R} \exists |x-y| < \epsilon$$

2. TRUE OR FALSE?

(a) $\forall x \in \mathbb{R}, \frac{1}{x} \in \mathbb{R}.$

(b) $\exists x \in \mathbb{R} \text{ s.t. } \frac{1}{x} \in \mathbb{R}.$

(c) $(x > y \wedge y > z) \rightarrow x > z$

3. PROVE OR DISPROVE THE VALIDITY OF THE ARGUMENT.

(a) $p \rightarrow q$

(b) $a \wedge \sim b$

$$\sim q$$

$$b \wedge \sim c$$

$$\therefore \sim p$$

$$\therefore \sim a \vee c$$

4. PROVE OR DISPROVE

(a) $n \text{ IS ODD} \rightarrow 2n \text{ IS ODD}.$

(b) $\exists n \text{ ODD} \exists 2n \text{ IS ODD}$

(c) $\forall x \in \{1, 2, 3, 4\}, x^2 < 20$

(d) $\exists x \in \{1, 2, 3, 4\} \exists x^2 < 10$

5. PROVE BY CONTRADICTION THAT THERE IS NO SMALLEST
POSITIVE REAL NUMBER

6. PROVE BY CASES THAT IF $x > 1$ OR $x < -1$, THEN $\sim |x| > 1$.