

Name: SSN: Row:

Do **only 4** of the following questions and show your work. Circle **clearly** the questions which you want to be graded. Circle **only 4**.

Question 1: (5 points) Let A be the interval $[-1, 3)$. Find $A \cap \mathbb{N}$.

Question 2: (5 points) Let $\{a_n\}_{n=1}^{\infty}$ be defined by $a_n = (n+1)2^{n-1}$, $\forall n \in \mathbb{N}$. Let $S = \{6, 8\}$. Find $\prod_{i \in S} a_{i-1}$.

Question 3: (5 points) Let a be the sequence defined by $a_n = 1 + (-1)^n$, $\forall n \in \mathbb{N}$. Is a increasing? Explain.

Question 4: (5 points) Let $X = \{1, 2, 3\}$. Give an example of a binary relation on X which is not symmetric and antisymmetric at the same time.

Question 5: (5 points) Let R be the relation on $\mathbb{N}$ defined by: $a R b$ iff $\frac{a}{b}$ is a natural number. Prove by a counter example that R is not symmetric.