

Four of these problems will be graded, with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor. Submissions must be on clean paper with no ragged edges.

1. For all $n \in \mathbb{N}$, $n! \geq 2^{n-1}$.
2. $\forall n \in \mathbb{N}$, 5 divides $n^5 - n$.
3. The sum of two rational numbers is rational.
4. The sum of two irrational numbers is irrational.
5. Between any two rational numbers there is another rational number.
6. For any integer n , the number $n^2 + n + 17$ is prime.
7. For any sets A and B , $(A \cup B)' = A' \cap B'$.
8. For any sets A , B , and C , $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

