

Math 215. Midterm 1
Spring 2008, A.Libgober

1. Show that there is a integer N such that the set of integers

$$\{N, N + 1, N + 2, \dots, N + 10\}$$

contains no primes.

2. Let S be the set of integers N such that $5 \leq N \leq 10$. How many subsets does S have? Give a proof to your answer.

3. What is a proof by contradiction? Give an example of a statement which can be proved by contradiction and explain the proof.

4. Let A, B be arbitrary sets. Show that

$$(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$$

Draw Venn diagram illustrating this identity.

5. Give a definition of a null sequence. Show that the sequence $\frac{1}{\sqrt{n}}$ is a null sequence.