

# M325K Prac. Test 3

1. Let  $U = \{1, 2, 3, \dots, 10\}$  be the universal set and let  $A = \{2, 4, 6\}$  and  $B = \{1, 4, 5\}$ . Find the number of elements in  $A^c \cap B^c$ ,  $A^c \Delta B^c$ , and  $\mathcal{P}(A \times B)$ .
2. Use induction to prove that the sum of the first  $n$  odd positive integers equals  $n^2$ .
3. Prove that  $2n + 1 < n^3$  for all integers  $n \geq 2$ .
4. Prove that if  $A \subseteq B$ , then  $A \cup B = B$ .
5. Use strong induction to prove that every integer greater than 1 is divisible by a prime.
6. How many mistakes are in the sentence “Ther are three mistakes in thiss sentence”? Justify your answer.