MAT 243 Online Written Homework Assignments for Week 7 (units 19-21)

Free Response Questions

1. Someone randomly selects an odd integer n in the interval [1,100]. What is the probability that n is not a prime number? You may use a table of prime numbers to answer the question.

2. 100 people have again come to the annual pet owner's meeting. This time, there are 52 people present who own cats and 59 who own dogs. Give the numerical answer and a brief explanation for each of the following questions:

    a. What is the minimum number of people who must own both a cat and a dog?

    b. What is the maximum number of people who could own both cat and dog, based on the information given?

3. Suppose S is a set of airports, and R is the following relation on S: aRb if and only if there is a direct flight from a to b. Explain your answers to the following questions and use common sense.

    a. Is R reflexive?

    b. Is R symmetric?

    c. Is R transitive?

    d. What is the meaning of the relation R^2? Specifically, when are two airports R^2 related?

4. If $S = \{1,2,3\}$ and $R = \{(1,2), (1,3), (2,3)\}$, find R^2.

5. Prove that if R is a symmetric relation, so is R^2.

6. Let $<$ denote the less than relation on the set of integers. Describe the squared relation $<^2$. Is it the same as $<$?