Probability and Statistics
Test 1
Fall 2005
Name:…….
10 points each

1 If $A \cup B = S$, $P(A) = 0.68$, $P(B) = 0.53$, then find $P(A \cup B')$

2 Let A_1, A_2, ….. be an infinite sequence of mutually exclusive events such that $P(A_i) = \frac{1}{3^i}$. Show that $P\left(\bigcup_{i=1}^{\infty} A_i\right) = 0.5$.

3 If A and B are independent with $P(A) = 0.4$ and $P(B) = 0.6$, then find $P(A \cap B \mid A \cup B)$.

4 If four balanced six-sided dice are rolled, what is the probability of getting 1, 2, 5, and 6 in any order?

5 If four balanced six-sided dice are rolled, what is the probability that each of the four numbers that appear will be different?

6 If $P(A|B) = 0.5$, $P(A) = 0.5$, and $P(B) = 0.7$, then find $P(A \cup B)$.

7 If A and B are independent events, then show that A and B' are also independent.

8 If $P(A \cup B) = 0.7$ and $P(A \cup B') = 0.9$, then find $P(A)$.

9 Bean seed from supplier A have a 90% germination rate and those from supplier B have an 80% germination rate. A seed packing company purchases 45% of their bean seeds from supplier A and 55% from supplier B and mixes these seeds together.

(a) Find the probability that a seed selected at random from the mixed seeds will germinate, say $P(G)$.

(b) Given that a seed germinates, find the probability that the seed was purchased from supplier B.

10 An urn contains 10 balls: 4 red and 6 blue. A second urn contains 16 red balls and an unknown number of blue balls. A single ball is drawn from each urn. The probability that both balls are the same color is 0.44. Calculate the number of blue balls in the second urn.

Hint: Let x be the number of unknown blue balls and solve for x.