Name: _____

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Test 1

[30]

1. Suppose $P(A) = .4$, $P(B) = .3$, and $P(B \cap A) = .2$. What are

   (a) $P(A')$?

   (b) $P(A|B)$?

   (c) $P(A \cup B)$?

   (d) Are A and B independent?

   (e) Are A and B disjoint?

2. Suppose you roll a pair of dice. For convenience, assume that one die is

[30]   red and the other blue.

   (a) What is the probability that their sum is at least 11?

   (b) What is the probability that their sum is at least 11 given that the red die is not a 6?

   (c) What is the probability that their sum is at least 11 given that there is at most one 6?

3. Suppose you are dealt 6 cards from a standard deck. In the following questions, do not simplify your answer. Leave it in terms of factorials or

[30]   ().

   (a) What is the probability that all 6 cards are hearts?

   (b) What is the probability of 3 of one rank and 3 of another?

   (c) What is the probability of 4 of one rank and 2 of another?

4. Factory A supplies 3/4 of the components we use, and Factory B supplies the rest. Two percent of Factory A's components and one percent of B's

[30]   are defective.

   (a) What proportion of components are defective?

   (b) Given that a component is defective, what is the probability that it came from Factory A?

5. Suppose events A and B are independent, mutually exclusive, and $P(B) =$

[30]   .1.

   (a) What is $P(A \cap B)$?

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(b) What is $P(A)$?

(c) What is $P(A \cup B)$?

[30]

6. Several important distributions are: Bernoulli, binomial, and geometric. What would be the most reasonable guess for the distribution in each of the following situations (give the simplest of the above that seems appropriate or specify "none of the above" if none of them fit)?

(a) Whether or not the next part passes inspection.

(b) The number of parts that pass inspection out of the next 25.

(c) Whether or not all 25 parts pass inspection.

(d) The number of parts tested until one fails.

(e) The number of parts tested until two have failed.