

Name: _____

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Test 1

- [30] 1. Suppose $P(A) = .5$, $P(B) = .4$, and $P(A \cap B) = .2$. Compute (a) $P(A')$, (b) $P(A | B)$, (c) $P(A \cup B)$, (d) $P(A' \cap B')$, and (e) $P(A' | B)$.
- [30] 2. Suppose the X has probability mass function $\Pr\{X = k\} = c(k + 1)$ for $k = 0, 1, 2$. Compute c , $\Pr\{X = 1\}$, $\Pr\{X \leq 1\}$, $\Pr\{X = 1 | X \leq 1\}$, and $\Pr\{X = 1 | X = 1\}$.
- [30] 3. Suppose I am dealt 8 cards from a standard 52 card deck. What is the probability of a flush? What is the probability of two fours, i.e., four of one kind and four of another? What is the probability of one kind and two pairs? You may leave your answer in terms of factorials or $\binom{n}{k}$.
- [30] 4. A company that assembles and sells computers has two sources for the hard drives. One percent of the hard drives of from Source A fail within the warranty period, while six percent of those from Source B fail within the same period. Sixty percent of the hard drives come from Source A. What is the overall proportion of hard drives that fail within the warranty period? Given a hard drive is defective, what is the probability that it came from Source A?
- [30] 5. Lucent produces fiber optic cables. A fiber is drawn and put on a spool until either the fiber either brakes or fills the spool and is cut. Each fiber is started on an empty spool since the fibers cannot be spliced. A fiber may have tiny defects located along its length. Let p be the probability that a spool is filled. What would be the name of a reasonable distribution for modelling the following? (a) whether the next fiber drawn is cut or not? (b) the number of fibers drawn until a fiber is long enough to fill a spool, (c) the number of full spools out of the 100 spools? (d) whether more than 50 out of the next 100 spools are full or not? (e) the number of defects in the next full spool (f) what is the probability mass function of the random variable described in question (c)?

1. (a) _____

(b) _____

(c) _____

2. (a) _____

(b) _____

(c) _____

3. (a) _____

(b) _____

(c) _____

(d) _____

(e) _____

4. (a) _____

(b) _____

5. (a) _____

(b) _____