

September 20, 2007

Time 75 min

NAME: _____

Instructions

1. You must show all work to receive full credit.
 2. Provide all the details.
 3. If you use a formula derived in the class, you must state it.
 4. The exam is closed book.
 5. *Answer any 5 questions.*
 6. Each question carries 5 points.
 7. Total 25 points
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3. Three cards are dealt from a deck of 52 playing cards. The deck consists of 26 black and 26 red cards.
- a) Find the probability that the first card drawn is red and the last two are black.

b) What is the probability that the first card chosen is red, given that the last two cards chosen are black?

4. Suppose A and B are two events with $P(A) = 0.75$, $P(B) = 0.375$. Show that

$$P(A \cup B) \geq 0.75 \quad \text{and} \quad 0.125 \leq P(A \cap B) \leq 0.375.$$

5. The proportions of motorists at Exxon gas station in college heights using regular, extra unleaded, and premium gas are 40%, 35%, and 25%, respectively. The respective proportions of filling their tanks are 30%, 50%, and 60%. If a randomly chosen motorist filled his/her tank, what is the probability that he/she used regular gas.

6. Suppose E , F and G are events relating to an experiment and $P(G)(1 - P(G)) > 0$. If

$$P(E|G) > P(F|G), \text{ and } P(E|G^c) > P(F|G^c),$$

Then either prove $P(F) < P(E)$, or justify your answer if it is false.