Name: _____

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ISYE 3027

Test 1

[30] 1. Define sample space, event, and give the three axioms of probability.

[30] 2. Suppose $P(A) = .3$, $P(B) = .1$, and $P(B \cap A) = .03$. What are

    (a) $P(A^c)$?

    (b) $P(A \mid B)$?

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

    (d) Are A and B independent?

    (e) Are A and B disjoint?

3. Suppose you are dealt 7 cards at random from a standard 52 card deck. In the following questions, do not simplify your answer. Leave it in terms

[30] of factorials or ().

    (a) What is the probability of a flush, i.e., all seven cards coming from one suit?

    (b) What is the probability of 2 triples, e.g. 3 queens, 3 aces and a king?

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

[60] B's 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. Let X_1 and X_2 be the numbers obtained in two independent throws of a

[30] die. Determine $\Pr\{X_1 + X_2 > 6 \mid X_1 > X_2\}$?

[1] 6. Bonus: Whose matchboxes?