

SAMPLE EXAM I

MATH 526 Applied Math. Stat., 9/18

Print Name:

Student Number:

The exam contains eleven problems of which the last one is extra credit. Show your work with brief explanations to ensure credit for the solution of each problem. Put a box around the answer to each problem. No use of calculators, books or notes is allowed. No use or viewing of electronic devices is allowed.

1. Find the probability that a hand of five cards from a deck of 52 cards contains exactly one triple and exactly one pair.
2. How many ways can a group of five men and five women be seated in a row of ten chairs so that no two men or no two women are seated next to each other?
3. Let A and B be independent events with $P(A) = .2$ and $P(B) = .7$. Find $P(A^c \cap B^c)$ where A^c and B^c are the complements of A and B respectively.
4. An urn contains ten white balls and fifteen red balls. If two balls are randomly chosen without replacement from the urn, then find the probability that the second ball chosen is red.
5. Let f be the probability density function given by

$$f(x) = \begin{array}{ll} cx & 0 < x < 1 \\ \frac{1}{2}(x-1) & 1 \leq x < 2 \\ 0 & \text{otherwise} \end{array}$$

Find c .

6. One fair die is rolled six times. Find the conditional probability that a 5 occurs at least twice in the six rolls given that exactly one 5 occurs in the first two rolls.

7. Each of ten distinct balls is randomly placed in one of ten cells, denoted 1 to 10, so that any cell may contain 0 to 10 balls. Find the probability that exactly one cell is empty.
8. Urn I contains ten red balls and 15 green balls and Urn II contains 7 red balls and 8 green balls. A fair die is rolled once. If the outcome on the die is from the set $\{1, 2\}$ then one ball is selected from Urn I and if the outcome on the die is from the set $\{3, 4, 5, 6\}$ then one ball is selected from Urn II. Find the probability of choosing a red ball.
9. In how many ways can six students be seated in a row that has ten chairs?
10. Three fair distinguishable dice are rolled once. If only even numbers occur then what is the conditional probability that exactly one 4 occurs?
11. A box contain 10 distinct pairs of shoes. If six shoes are randomly chosen without replacement, what is the probability that there is exactly one pair among the six shoes?