

Midterm II Review Problems

- 1) Two teams, A and B, play a series of up to 5 games that ends when either team wins 3 games. If team A has probability 0.4 of winning each game, what is the probability that it will win the series?
- 2) A four-year-old girl is getting dressed for school one morning without supervision. She is choosing from her wardrobe of 3 pink shirts, 2 purple shirts, 2 blue shirts, 1 pair of blue pants, 2 pairs of purple pants, and 3 pairs of pink pants. If she chooses her shirt and pants at random, what is the probability that she'll pick a pink shirt and a blue pair of pants?
- 3) A scientist is running an experiment and is interested in the probability that a certain chemical reaction will occur within 1 minute of the start of the experiment. Let X be the length of time until the reaction occurs. What is $P(X \leq 1)$ if X is uniformly distributed on the interval $(0,3)$?
- 4) Suppose that in a city the number of suicides can be approximated by a Poisson process with $\lambda = 0.33$ per month. What is the probability of two suicides in a month?
- 5) Let X be a discrete random variable that takes on values 0, 1, and 2 with respective probabilities $\frac{1}{2}$, $\frac{3}{8}$, and $\frac{1}{8}$. Find $E(X)$ and $\text{Var}(X)$.
- 6) A landscaper plants bushes in poor soil in a corner of a client's yard. She estimates that the probability that any bush planted in this area will survive is about 0.4. She decides to plant six bushes. What is the probability that at least two of the six planted bushes will live?
- 7) The random variable X is normally distributed with mean 10 and variance 100.
 - a) What is $P(X > 10)$?
 - b) What is $P(-5 \leq X \leq 5)$?
 - c) What is $P(X > 20 \text{ or } X < 0)$?
- 8) Let X equal the number out of $n=48$ mature aster seeds that will germinate when $p=0.75$ is the probability that a particular seed germinates. Using the continuity correction, determine $P(35 \leq X \leq 40)$, approximately.
- 9) In roulette, the probability of winning with a bet on red is $p = 18/38$. Let Y equal the number of winning bets out of 1000 independent bets that are placed. Find $P(Y > 500)$ approximately, using the continuity correction.
- 10) 55% of the registered voters in a given town favor their incumbent mayor in her reelection campaign, but many of them aren't likely to vote. If only 400 voters go to the polls on election day, approximate the probability that the challenger will win the election. Use the continuity correction.