

Exam 1 Review

- (1.) Suppose that Box 1 contains 2 red and 8 black balls and Box 2 contains 10 red and 20 black balls. One box is selected at random and then a ball is selected from that box.
- (a.) What is the probability that the ball which is drawn is red?
 - (b.) Given that the ball which was drawn was red, what is the probability that it was drawn from box 1?
- (2.) Ten tickets labeled $0, 1, \dots, 9$ are placed in a box, and five are drawn at random. Find the probability that the largest number drawn is 7 if the drawings are made:
- (a.) with replacement
 - (b.) without replacement.
- (3.) An 8-sided die is rolled 25 times.
- (a.) Give an expression for (but do not compute) the probability that at least eight 5's are rolled.
 - (b.) Give a normal approximation to the probability in (a.)
 - (c.) Give a Poisson approximation to the probability that at most three 5's were rolled.
- (4.) A 10-sided die is rolled 10 times.
- (a.) What is the probability that all 10 numbers appear in the 10 rolls?
 - (b.) What is the probability that the number 2 appears exactly three times?
- (5.) A pollster wishes to know the percentage p of people who intend to vote for issue A . How large should a random sample with replacement be to be at least 90% sure that the sample is within 1% of p ?
- (6.) A probability class has 31 students. Each student tosses a fair coin 400 times and records the number of heads. Approximate the probability that all 31 students get no more than 219 heads each.
- (7.) Suppose that A, B and C are events such that:
- $$P(A) = 0.22, P(B) = 0.18, P(C) = 0.16$$
- $$P(A \cap B) = 0.13, P(A \cap C) = 0.12, P(B \cap C) = 0.1$$
- $$P(A \cap B \cap C) = 0.07$$
- (a.) Find the probability that exactly two of A, B, C occur.
 - (b.) Find the probability that exactly one of A, B, C occur.
 - (c.) Find the probability that none of A, B, C occur.
- (8.) Five cards are dealt without replacement from a deck of 52 playing cards. What is the probability that a full house has been dealt? (ie. is of the form (x, x, y, y, y))