

Written Homework 3

Due Friday, November 4

- The House Speaker needs to form an environmental panel with 3 members on it. She has to choose among 10 members: 4 from California, 3 from Colorado and 3 from Michigan.
 - (4 points) How many possible panels can she form?
 - (4 points) How many panels are possible, if one representative for each state must sit in the panel?
 - (4 points) How many panels consists of 2 members from California and 1 from Michigan?
 - (4 points) Moreover, the speaker has to assign a distinct member (taken from the same group of 10) to each of 4 different projects. In how many ways can she do this?
- Three cards are drawn, without replacement, out of a standard deck of 52 cards. Find the probability of obtaining:
 - (5 points) 3 kings;
 - (5 points) 2 clubs;
 - (5 points) at least one queen;
 - (5 points) 1 or 2 aces.
- (8 points) The game of European roulette involves spinning a wheel with 37 slots: 18 red, 18 black and 1 green. A ball is spun onto the wheel and will eventually land in a slot, where each slot has an equal chance of capturing the ball. Gamblers can place bets on red or black. If the ball lands on their color, they win the money they bet. If it lands on another color, they lose the money they bet. Suppose you play roulette and bet \$3 on a single round. What is the expected value of your total winnings?
- The National Vaccine Information Center estimates that 90% of Americans have had chickenpox by the time they reach adulthood. Find the probability that:
 - (8 points) 97 out of 100 randomly sampled American adults have had chickenpox;
 - (8 points) at most 3 out 10 randomly sampled American adults have *not* had chickenpox;
- In a multiple choice quiz there are 5 questions and 4 choices for each question. Robin has not studied for the quiz at all, and decides to randomly guess the answers. What is the probability that:
 - (8 points) the first question she gets right is the third one?
 - (8 points) she gets exactly 3 questions right?
 - (8 points) she gets the majority of the questions right?
- Nancy and Karen play a game of cards as follows. Nancy draws 3 cards out of a regular deck of 52 cards without replacement: if she draws at least one ace, she wins. Otherwise, Karen wins. Suppose they play the games 10 times, and after each time, the cards are placed back in the deck and reshuffled.
 - (8 points) Find the probability that Nancy wins exactly 4 times.
 - (8 points) Find the expected number of times Karen wins.