One of the problems below will be chosen at random in class for a quiz.

1. Find the probability of winning a lottery by selecting the correct six integers, where the order in which these integers are selected does not matter, from the positive integers not exceeding

   (a) 30.
   (b) 36.
   (c) 42.
   (d) 48

2. What is the probability that Bo, Colleen, Jeff, and Rohini win the first, second, third, and fourth prizes, respectively, in a drawing if 50 people enter a contest and

   (a) no one can win more than one prize.
   (b) winning more than one prize is allowed.

3. In a superlottery, a player selects 7 numbers out of the first 80 positive integers. What is the probability that a person wins the grand prize by picking 7 numbers that are among the 11 numbers selected at random by a computer.

4. What is the conditional probability that exactly four heads appear when a fair coin is flipped five times, given that the first flip came up tails?

5. Let E be the event that a randomly generated bit string of length three contains an odd number of 1s, and let F be the event that the string starts with 1. Are E and F independent?

6. Find each of the following probabilities when n independent Bernoulli trials are carried out with probability of success p.

   (a) the probability of no successes
   (b) the probability of at least one success
   (c) the probability of at most one success
   (d) the probability of at least two successes