1. A fair coin is tossed 4 times.

   a) What is the probability of getting 4 heads?
   b) What is the probability of not getting 4 heads?
   c) What is the probability of getting 2 heads and 2 tails?
   d) What is the probability of getting at least 2 tails?

2. Two fair dice are tossed.

   a) What is the probability of rolling 2 ones?
   b) What is the probability of not rolling 2 ones?
   c) What is the probability of rolling a three on the first die or a one on the second die?
   d) What is the probability of getting a sum of five on the two die?
   e) What is the probability that the sum of the two dice is less than or equal to five?
   f) Given that a three appears on at least one of the dice, what is the probability that the sum of the two dice is less than or equal to five?
   g) Given that the sum of the two dice is less than or equal to five, what is the probability that a three appears on at least one of the dice?

3. A box contains 12 red marbles and 8 blue marbles. Three marbles are drawn at random with replacement.

   a) What is the probability of getting 3 reds?
   b) What is the probability of not getting 3 reds?
   c) What is the probability of getting 2 reds and 1 blue?
   d) What is the probability of getting at least 2 reds?

4. A box contains 12 red marbles and 8 blue marbles. Three marbles are drawn at random without replacement.

   a) What is the probability of getting 3 reds?
   b) What is the probability of not getting 3 reds?
   c) What is the probability of getting 2 reds and 1 blue?
   d) What is the probability of getting at least 2 reds?

5. One card is drawn from a well-shuffled deck of 52 cards.

   a) What is the probability that the card is a red card?
   b) What is the probability that the card is a face card? (J,Q,K)
   c) What is the probability that the card is a queen or a club?
   d) What is the probability that the card is a heart or a face card?
   e) What is the probability that the card is an ace or a king?

6. Two cards are drawn from a well-shuffled deck of Pinochle cards. A deck of Pinochle cards contains 48 cards. There are four suits: clubs, diamonds, hearts and spades. There are 2 of every card 9 thru ace. There are no 2's, 3's, 4's, 5's, 6's, 7's or 8's.
a) What is the probability that the first card drawn is an ace?

b) What is the probability that the second card drawn is an ace?

c) What is the probability that both cards are aces?

d) What is the probability of getting a heart or a club on either or both of the 2 cards?

e) What is the probability of getting a heart and a club?

7. A fair coin is tossed 10 times.

a) What is the probability of getting 5 heads and 5 tails?

b) What is the probability of getting at least 8 heads?

8. A fair die is rolled 10 times.

a) What is the probability of getting exactly 5 ones?

b) What is the probability of getting at least 2 ones?

9. Joe Doubtful says that there is a 55% chance that he will go to the class picnic if it does not rain but only a 30% chance that he will go if it does rain. The weather forecast is for a 40% chance of rain the day of the picnic.

a) What is the probability that Joe will go on the picnic?

b) Given that Joe went on the picnic, what is the probability that it rained on the day of the picnic?

10. At a certain university, 4% of the men and 1% of the women are taller than 6 feet and 40% of the students are women.

a) If a student is selected at random at this university, what is the probability that the student is taller than 6 feet?

b) If a student is selected at random and is taller than 6 feet, what is the probability that the student is a woman?

11. Wheel of Fortune has come to WFU to choose contestants for a special college edition. The final pool of candidates contains 6 females and 4 males. Three students are to chosen at random from this pool to be contestants on the show. What is the probability that there will be at least 2 males chosen for the show?

12. If the Yankees and the Mets meet in the World Series, (one team must win 4 out of 7 to win the series) the probability that the Mets sweep the series (win the first 4 games)? Be sure to draw the probability tree.

b) What is the probability that the Yankees and the Mets split the first four games (each team wins 2)?

13. A box contains 8 socks: 3 blue, 2 green, and 3 white. You randomly pick out 2 socks and put them on.

a) What is the probability that you are wearing 1 blue sock and 1 white sock?

b) What is the probability that your socks match?
14. Two fair die are tossed
   a) What is the probability of getting a 4 on the first die or a 6 on the second die? \( \frac{11}{36} \)
   b) What is the probability of getting a 4 on either die given that the sum of the two dice is 7? \( \frac{2}{11} \)
   c) What is the probability that the sum of the dice is greater than 6 given that at least one of the dice is a 4? \( \frac{7}{11} \)

15. Sam is a player on the Connolly College basketball team. If he hits his first shot in a game, there is an 80% chance that he will hit his second shot. However, if he misses his first shot, there is only a 50% chance he will hit his second shot. There is a 60% chance that Sam will hit his first shot in any game.
   a) What is the probability that Sam will hit his second shot? \( 0.70 \)
   b) What is the probability that Sam hit his first shot given that he hit his second shot? \( 0.60 \)

16. A fair die is tossed 10 times.
   a) What is the probability of getting exactly three 4's? \( \frac{1}{6} \)
   b) What is the probability of getting exactly six 1's? \( \frac{1}{36} \)

17. A bag contains 8 pieces of chocolate candy and 6 pieces of peppermint candy.
   a) If you choose 6 pieces of candy, putting each piece back in the bag before picking the next piece, what is the probability that you get 3 pieces of chocolate candy and 3 pieces of peppermint candy? \( \frac{38,380}{15,678} \)
   b) If you choose 6 pieces of candy, putting each piece back in the bag before picking the next piece, what is the probability that you get 5 pieces of chocolate candy and 1 piece of peppermint candy? \( \frac{15,678}{38,380} \)

18. A basket contains 10 navy beans and 8 pinto beans. If you draw 8 beans from the bag with replacement, what is the probability that you draw 5 navy beans and 3 pinto beans? \( \frac{a}{g} \)

19. A bag of popping corn contains 70% white kernels and 30% yellow kernels. 75% of the white kernels are expected to pop and 85% of the yellow kernels are expected to pop. Suppose a randomly selected kernel does pop. What is the probability that it was a white kernel? \( 0.673 \)

20. You have a bowl of candy containing 10 original snickers and 10 crispy snickers. While watching the Olympics on television, your roommate randomly picks a piece of candy out of the bowl and tosses it to you on 3 different occasions. If it is an original snickers you eat it. If it is a crispy snickers you discreetly put it in your pocket. What is the chance that you eat 2 original snickers during the broadcast? \( \frac{39,486}{100} \)

21. You have a bowl of candy containing 10 original snickers and 10 crispy snickers. While watching the Olympics on television, your roommate randomly picks a piece of candy out of the bowl and tosses it to you on 3 different occasions. If it is an original snickers you eat it. If it is a crispy snickers you discreetly put it back into the bowl (immediately and without your roommate seeing you). What is the chance that you eat 2 original snickers during the broadcast? \( \frac{37,474}{100} \)
22. You have a bowl of candy containing 10 original snickers and 10 crispy snickers. While watching the Olympics on television, your roommate randomly picks a piece of candy out of the bowl and tosses it to you on 3 different occasions. Not wanting to embarrass him/her (you are allergic to chocolate) you discreetly put each piece of candy back in the bowl (immediately and without your roommate seeing you). What is the chance that you put 2 original snickers back in the bowl during the broadcast?

\[ \left( 37.5 \% \right) \]

23. Widget International produces widgets at its plant with 3 machines known as A, B, and C. Machine A produces 50% of the widgets, B produces 30% of the widgets and C produces 20% of the widgets. A produces defective widgets at a rate of 3%, B at a rate of 4% and C at a rate of 5%. If a widget is chosen at random and is found to be defective, what is the probability that it was produced by machine A?

\[ \left( 40.54 \% \right) \]

24. If John studies for his next Prob/Stats test the chance that he will make a C or better is 85%. If he doesn't study, the chance that he will make a C or better is only 30%. There is a 65% chance that John will study for this next test. What is the chance that John will make a C or better on his next Prob/Stats test? If John did not make a C or better on the test, what is the chance that he studied for the test?

\[ P(\text{or better}) \approx 65.75 \% \]

\[ P(S \mid \sim C) \approx 28.47 \% \]