1. In a bag containing 30 balls, 5 are black. What is the probability of drawing a black ball from the bag? The probability is:

(a) The probability of drawing a black ball.

(b) The probability of drawing a non-black ball.

2. In a women's raffle, there are 10 tickets numbered 1 to 10, each owned by a different woman. In a men's raffle, there are 6 tickets numbered 1 to 6, each owned by a different man. A ticket is drawn at random from either raffle. Find the probability of the given event.

(a) The ticket is owned by a woman.

(b) The ticket has an odd number.

(c) The ticket is owned by a woman or has an odd number.

(d) The ticket is owned by a man and has an even number.

3. Suppose a box contains 15 green balls and 25 yellow balls. If you reach into the box and pull out 3 balls at random at the same time, find the probability that all 3 balls are green.

4. In a survey about preferred leisure activities, the responses and age groups are summarized below:

Table 1: Summary of Preferred Leisure Activities by Age Group

	Reading	**Watching Movies**	**Playing Sports**	**Total**
Under 20	30	20	15	65
20-30	25	15	10	50
Total	55	35	25	115

If one respondent is chosen at random,

(a) Find the probability that the respondent is under 20 OR enjoys reading.

(b) What is the probability that the respondent is under 20, between 20-30, or over 30?

(c) What is the probability that the respondent enjoys playing sports given that they are between 20-30 years old?

5. Consider a different disease with an incidence rate of 1.2%. If the false negative rate is 10% and the false positive rate is 3%, calculate the probability that a person who tests positive actually has the disease.

6. In a factory producing electronic components, there are two machines: Machine A and Machine B. Machine A produces 60% of the components, while Machine B produces the remaining 40%. From Machine A, 2% of the components are defective, while from Machine B, 5% of the components are defective.
If a randomly selected component is found to be defective, what is the probability that it was produced by Machine A?

7. In a school cafeteria, there are two vending machines: Machine A and Machine B. Machine A dispenses 70% of the snacks, while Machine B dispenses the remaining 30%. From Machine A, 10% of the snacks are expired, while from Machine B, 5% of the snacks are expired.
If a randomly selected expired snack is chosen, what is the probability that it came from Machine A?

8. In a hospital, there are two wards: Ward A and Ward B. Ward A admits 60% of the patients, while Ward B admits the remaining 40%. From Ward A, 15% of the patients develop complications after surgery, while from Ward B, 10% of the patients develop complications after surgery.
If a randomly selected patient develops complications after surgery, what is the probability that the patient was admitted to Ward A?

9. A woman owns 5 pairs of jeans, 8 blouses, 3 scarves, and 2 sweaters. How many different outfits can she create if she must wear one of each item?

10. How many different ways can the raffle tickets labelled 1 to 7 be pulled out of a hat?

11. How many ways can gold, silver, and bronze medals be awarded in a competition with 30 participants?

12. In how many ways can 3 courses be selected from a menu offering 12 different dishes at a restaurant?

13. From a group of 15 employees, you randomly select 3 of them. What is the probability that they are the 3 newest employees in the group?

14. You pick 5 letters at random without replacement from the alphabet (a-z), and write them in the order picked. What is the probability that you have written the first 5 letters of your last name? Assume there are no repeats of letters in your last name.

15. In a bingo game, a player picks five numbers from 1 to 75. If the player matches all five numbers, they win $500. Otherwise, they lose $5. What is the expected value of this game?

16. A box contains 5 red balls, 10 blue balls, and 15 green balls. Someone offers to play this game: You randomly select one ball from the box. If it is red, you win $6. If it is blue, you win $4. If it is green, you lose $2. What is your expected value if you play this game?