## EXERCISE 9C

## PROBABILITY INVOLVING PERMUTATIONS AND COMBINATIONS

1. A bag contains 4 black balls and 3 white balls. Two balls are withdrawn without replacement. Find the probability of drawing 2 black balls.

2. If 3 coins are tossed simultaneously, how many outcomes are possible ? What is the probability that there will be

   (a) 0 heads;
   (b) 1 head;
   (c) 2 heads.

3. Four girls and four boys arrange themselves in a row. What is the probability that the girls and boys occupy alternate positions ?

4. Your mathematics tutorial class consists of 16 students. You and one of your friends are in this class. Three students are selected at random to write on the blackboard.

   (a) What is the probability that you will be selected ?
   b) What is the probability that you will be selected but your friend will not ?

5. Five cards are selected at random from a pack of 52 playing cards. What is the probability that they are all hearts ?

6. From a group of 7 pupils and 5 teachers, a random selection of 7 is made. What is the probability that it contains, at least, 4 pupils ?

7. A committee of 4 men and 3 women is chosen from 7 men and 6 women. What is the probability that it contains a particular man and a particular woman?

8. Eight people, of whom $X$ and $Y$ are two, are arranged, at random, in a straight line. What is the probability that

   (a) $X$ and $Y$ are next to each other;
   (b) $X$ and $Y$ occupy the end positions;
   (c) There are, at least, 3 people between $X$ and $Y$.

9.    The letters of the word potato are arranged, at random, in a row.  What is the probability that

   (a)    The two letters T are together;
   (b)    The two letters T occupy the end positions ?

10.    The numbers 1,2,3,4,5 are used to form 5-digit numbers.  What is the probability that the 2 and 3 will be next to each other ?

# ANSWERS

1.    $\dfrac{2}{7}$

2.    (a)  $\dfrac{1}{8}$;    (b)  $\dfrac{3}{8}$    (c)  $\dfrac{3}{8}$

3.    $\dfrac{1}{35}$

4.    (a)  $\dfrac{3}{16}$    (b)  $\dfrac{13}{80}$

5.    $\dfrac{33}{66640}$

6.    $\dfrac{149}{198}$

7.    $\dfrac{2}{7}$

8.    (a)  $\dfrac{1}{4}$    (b)  $\dfrac{1}{28}$    (c)  $\dfrac{5}{14}$

9.    (a)  $\dfrac{1}{3}$    (b)  $\dfrac{1}{15}$

10.    $\dfrac{2}{5}$