Worksheet J: Permutations and combinations practice questions

**1** Find the number of different selections of 5 letters from the 10 letters of the word BLACKSMITH.

**2** A college minibus has 12 passenger seats. How many possible seating arrangements are there for 8 passengers?

**3** A class of 25 students has 17 boys and 8 girls. The teacher is to select 2 students for a prize. Find the number of selections which have at least one boy.

**4** The head girl and deputy-head girl of a school are to be chosen from a list of 5 girls and the head boy and deputy-head boy are to be chosen from a list of 6 boys. In how many different ways can this be done?

**5** In an exam, candidates must answer 8 questions. They must select at least 3 from the 5 questions in section A and at least 4 from 7 questions in section B.

Find the number of selections a candidate can make.

**6** 3 girls and 4 boys wish to sit in a row of 10 seats.

The 3 girls sit in the seats on the left and the 4 boys sit on the right.

How many possible seating arrangements are there?

**7** Find how many numbers between 3000 and 4000 can be formed using the digits   
1, 2, 3, 4, 5, 6 if

(a) digits are allowed to be repeated

(b) digits must not be repeated.

**8** Anil and Banhi have 33 new music tracks:

* 18 are rock
* 9 are pop
* 6 are metal.

(a) From these tracks, Anil makes a selection of 4 rock, 4 pop and 2 metal. How many different possible selections can he make?

(b) Banhi makes a playlist using 8 of the 18 rock tracks. How many different possible playlists can she make?

**9** Find the number of ways of choosing a quiz team of 5 players from 6 men and 8 women if:

(a) there are more women than men in the team

(b) 3 of the men are brothers and are either all **in** the team or all **not** in the team.

Worksheet J: Permutations and combinations practice questions continued

**10** Terry has 10 books, including one book of poetry. He chooses 3 of these books to take with him on a trip.

(a) In how many ways can he choose 3 of his books?

(b) How many of these choices will not include the book of poetry?

**11** A committee of 3 people, a chairperson, secretary and treasurer, are to be chosen from the 30 members of a gardening club.

Find the number of ways this can be done if:

(a) there are no restrictions

(b) one of the members, Abu, refuses to be on the committee if another member, Nikki, is on the committee.

**12** An art gallery is planning to display 12 paintings in a line along a wall.

* 2 paintings are by Adam (A).
* 2 paintings are by Basu (B).
* 3 paintings are by Chen (C).
* 4 paintings are by De Witt (D).
* 1 painting is by Easterlefa (E).

(a) Find the number of possible arrangements of these 12 paintings.

(b) 4 of the 12 paintings are to be sold at an auction. Exactly one of the paintings must be by Basu and exactly one must be by Chen.

Find the number of ways in which these 4 paintings can be selected.

**13** Three letters from the 9 letters of the word FOOTSTOOL are selected.

(a) Find the number of selections which contain no Os and exactly one T.

(b) Find the number of selections which contain no Os.

**14** Four letters from the 11 letters of the word ACCELERATED are chosen.

Find the number of different selections which contain no Cs and no As and at least 2 Es.

**15** Four letters are selected from the 10 letters of the word ADVERTISER.

Find the number of different selections if the four letters must contain the same number of Es and Rs with at least one of each.