

SHARP

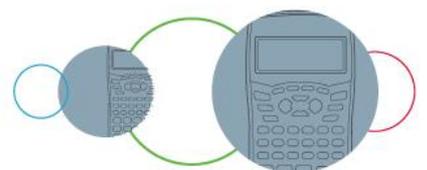
Worksheet 10: The Fundamental Counting Principle

Grade 12 Mathematics

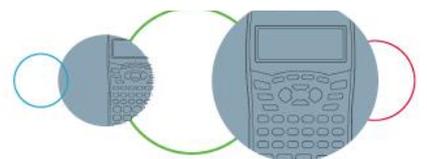
1. For each of the stories below, say whether it is a permutation or combination:
 - a) 200 students who enter a competition to win a prize.
 - b) 200 students, 10 of whom are chosen as volunteers
 - c) 7 children run a race.
 - d) 10 cars entered for Car of the Year.
 - e) a sample of 100 random people selected from your neighbourhood for a survey.

2. Paul works at a bank and has a uniform. He can wear either black or grey pants, a white, blue or black shirt and either a red, black, blue or grey tie.
 - a) How many possible uniform outfits can be made using the items of clothes given above?
 - b) What is the chance that Paul will wear his black pants, white shirt and red tie?
 - c) What is the chance that Paul will wear his black shirt?
 - d) How many ways can the ties be arranged over 4 days without repeating any of the ties?
 - e) What is the chance that Paul will wear the ties in the order black, blue, grey and red?
 - f) How many ways can the ties be worn in 4 days if the ties can be repeated?

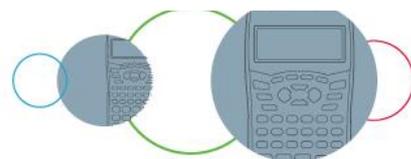
3. There are green marbles, blue marbles, red marbles and orange marbles in a big bag.
 - a) If there are 40 marbles in the bag, how many unique ways can the marbles be divided amongst their colours?
 - b) What is the probability that all the marbles will be distributed equally?



4. Given the word P R E S T I D I G I T A T I O N
(it means sleight of hand or quick fingers).
- a) How many ways can the letters in the word prestidigitation be arranged?
 - b) How many 6 letter “words” can be made using the all the letters above?
 - c) How many 6 letter words can be made if there can be no repeated words?
 - d) If 5 letters are randomly selected from the word above, how many ways can the letters be chosen?
 - e) What is the chance of getting the word “tastier” from “prestidigitation”?
5. 12 people were invited to a dinner party and seated around the table.
- a) If there are 7 ladies and they are seated next to each, how many different ways can the ladies be seated?
 - b) If the guests randomly draw their seat number from a hat, how many possible ways can all the guests sit around the table?
 - c) After dinner, the party separates to go home, and breaks into groups of 4 each travelling in a different direction, how many different ways can the dinner guests be grouped.
 - d) The dinner party is a dress-up party and prizes are awarded to the first, second and third best dressed. How many possible ways are there for the prizes to be given out?
 - e) If the top 3 best-dressed are chosen, but it doesn't matter who is first, second or third, how many different ways can the top 3 be chosen?
6. Look at the word given: P E R P E N D I C U L A R
- a) How many ways can the letters in the word above be arranged?
 - b) How many repetitions can be found if we wrote out the words we created in question a)?
 - c) How many unique ways can the word perpendicular be arranged?
 - d) if 5 letters are randomly chosen from “perpendicular” how many unique groups of letters can be made?
 - e) If any of the letters can be repeated again, how many 5 letter groups can be made (different arrangements with the same letters count as the same group)?



7. There are three major political parties in the country, the ANC, the DA and the EFF.
- If there are 150 voters, how many different ways can the votes for each of the parties be cast?
 - If there are 10 voters:
 - What is the probability that all 10 voters vote for the ANC?
 - What is the probability that a group of 3 of the 10 voters will vote for the EFF?
 - What is the probability that 7 of the 10 voters will vote for the DA?
8. A multiple choice test has 15 questions with 4 options (A, B, C, or D).
- How many different ways can the test be answered?
 - What is the probability that a student will guess all 15 of the answers correctly?
9. A gardener has bought a selection of plants: 5 roses, 3 tulips, 4 creepers, 7 daffodils and 6 jasmine bushes.
- How many different ways can all the plants be arranged?
 - If all the roses are planted together in a row, how many ways can the roses be arranged?
 - If only the tulips, creepers and daffodils are planted together in a row, how many ways can these flowers be arranged?
 - The gardener decides to randomly select 5 out of all the plants and arrange them in a row in the front garden, how many ways can the 5 plants be selected?
 - How many ways can 5 randomly selected plants from all the plants the gardener bought be arranged in a row?
10. Fikile likes to read and collect books by three of her favourite authors. She has 5 books by David Baldacci, 7 books by Danielle Steel and 3 books by John Grisham.
- Fikile wants to loan Belinda a book from each of the authors. How many different ways can Fikile pick the 3 books?
 - How many ways can Fikile arrange the books on a shelf if the books by the same author are kept together?
 - Fikile wants to take 5 books with her on holiday. How many different ways can she pick the books from the shelf?



d) What is the chance that Fikile will select all 5 of the David Baldacci books to take with her on holiday?

11. There are 16 children playing a game.

a) If there are 2 teams, how many different ways can the teams be selected?

b) If there are 4 teams, how many different ways can the teams be selected?

c) If there are 8 teams, how many different ways can the teams be selected?

