

MATHEMATICS • CLASS 11

CHAPTER 6

Permutations and Combinations

NCERT SOLUTIONS



EXERCISE 6.1 – QUESTIONS 1–2

Q1: Form 3-digit numbers from 1, 2, 3, 4, 5.

(i) Repetition allowed.

5 choices for each of 3 places.

$$5 \times 5 \times 5 = 125.$$

(ii) No repetition.

$$5 \times 4 \times 3 = 60.$$

Q2: Form 3-digit EVEN numbers from 1, 2, 3, 4, 5, 6; repetition allowed.

Unit place: 2, 4, 6 (3 choices).

Hundreds and tens: 6 choices each.

$$\text{Answer: } 6 \times 6 \times 3 = 108.$$

EXERCISE 6.1 – QUESTIONS 3–4

Question 3:

How many four-letter codes can be formed using the first 10 English letters if no letter is repeated?

Solution:

There are 10 choices for the first place, 9 choices for the second place, 8 choices for the third place and 7 choices for the fourth place.

$$\begin{aligned}\text{Number of codes} &= 10 \times 9 \times 8 \times 7 \\ &= 5040\end{aligned}$$

Hence, 5040 codes can be formed.

Question 4:

How many five-digit telephone numbers can be formed using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 if the number starts with 67 and no digit is repeated?

Solution:

The first two places are fixed as 6 and 7. The remaining 3 places can be filled using 8 unused digits, giving 8 choices for the third place, 7 choices for the fourth place and 6 choices for the fifth place.

$$\begin{aligned}\text{Number of numbers} &= 8 \times 7 \times 6 \\ &= 336\end{aligned}$$

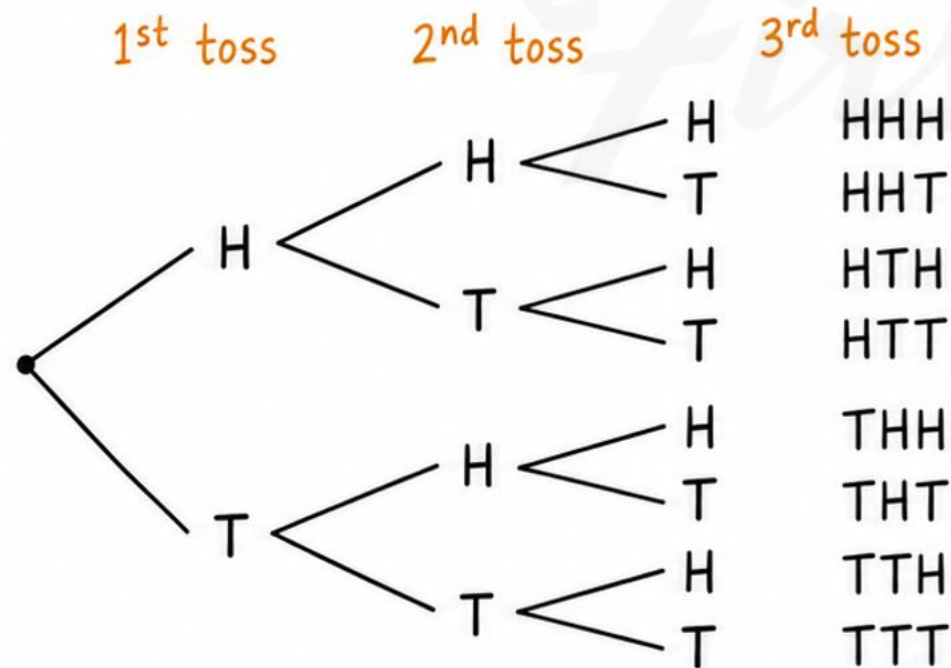
Hence, 336 numbers can be formed.

EXERCISE 6.1 – QUESTIONS 5–6

Q5. Toss a coin 3 times; each toss has H or T (2 choices).

Ordered outcomes:

$$2 \times 2 \times 2 = 2^3 = 8.$$

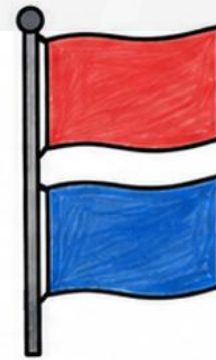


Q6. Five different coloured flags; signal uses two flags, one below the other.

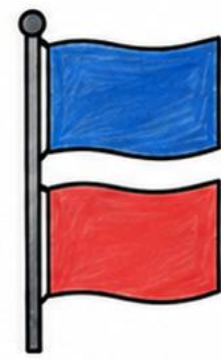
Top flag: 5 choices; lower flag: 4 remaining choices.

Answer: $5 \times 4 = 20$ distinct signals.

Reversing flag order makes a different signal.



Red above Blue



Blue above Red

EXERCISE 6.2 — QUESTIONS 1–2

Question 1

(i) $8!$

Solution:

$$\begin{aligned} 8! &= 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \\ &= 40320. \end{aligned}$$

(ii) $4! - 3!$

Solution:

$$\begin{aligned} 4! - 3! &= 24 - 6 \\ &= 18. \end{aligned}$$

Question 2

Is $3! + 4! = 7!$?

Solution:

$$\text{Left side} = 3! + 4! = 6 + 24 = 30.$$

$$\text{Right side} = 7! = 5040.$$

Since $30 \neq 5040$, NO.

Addition of factorials does not combine factorial arguments.

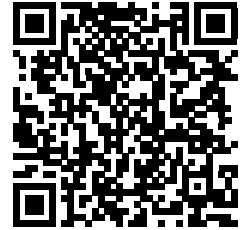


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