

Self exercise 13

1. On my desk, I have ^{five} different Economic books and seven different Mathematic books.

a) In how many ways can I select three Economics books?

$${}^5C_3 = 10$$

b) In how many ways can I select four Mathematics books

$${}^7C_4 = 35$$

c) In how many ways can I select six different books?

5 Economic Books	7 Mathematics Books	Number of ways
1	5	${}^5C_1 \times {}^7C_5 = 105$
5	1	${}^5C_5 \times {}^7C_1 = 7$
2	4	${}^5C_2 \times {}^7C_4 = 350$
4	2	${}^5C_4 \times {}^7C_2 = 105$
3	3	${}^5C_3 \times {}^7C_3 = 350$

$$\begin{aligned}\text{Total of ways} &= 105 + 7 + 350 + 105 + 350 \\ &= 917 \text{ ways}\end{aligned}$$

d) In how many ways can I select six books if I choose an equal number of Economics and Mathematic books.

$${}^5C_3 \times {}^7C_3 = 350 \text{ ways}$$

e) In how many ways can I choose four books if I choose more Mathematics books than Economic books

$$= {}^5C_4 \times {}^7C_4 \rightarrow = 175 \text{ ways}$$

$${}^7C_4 \times {}^5C_0$$

2 ways rule =

2. A number lock has 9 different digits. A combination of three digits can be set to open the lock. How many combinations are possible?

$$\boxed{9} \times \boxed{9} \times \boxed{9} = 729 \text{ ways}$$

3. In a class, there are 15 students. Out of them, 9 are boys. A team is to be formed with 10 students of them 6 must be boys. In how many ways can the team be formed?

only 6 boys

9 boys 6 girls

$${}^9C_6 \times {}^6C_4$$

$$= \underline{\hspace{2cm}}$$

9 Boys	6 Girls	Number of ways
6 ✓	4 ✓	${}^9C_6 \times {}^6C_4 = 99$
8	2	${}^9C_8 \times {}^6C_2 = 135$
9	1	${}^9C_9 \times {}^6C_1 = 6$
7 ✗	3	${}^9C_7 \times {}^6C_3 = 720$

$$\begin{aligned} \text{Total of ways} &= 99 + 135 + 6 + 720 \\ &= 960 \text{ ways} \end{aligned}$$

4. How many different 3-letter permutations can be formed using the letters in the word "SCARED" exactly once?

$$= \frac{6!}{(6-3)!} = 120$$

$$= \frac{720}{6}$$

5. Find the number of ways of choosing 4 members from a team of 15 members.

$${}^{15}C_4 = 1365 \text{ ways}$$

6. State "TRUE" or "FALSE" for the following statements.
If the statement is "FALSE", then find the correct answer.

a) $2! + 5! = 127$

= FALSE

$2! + 5! = 120$ ✓

b) $4! \times 1! + 0! = 52$

= FALSE

$4! \times 1! + 0! = 24$ ✓

c) $\frac{9!}{(9-2)!} = 72$

(9-2)!

= TRUE ✓

7. Henry lists different arrangements of the letters in the word NKP as follows: NPK, NKP, PKN, PNK and PKN. Find the number of arrangements not included in the list.

~~$26 \times 25 \times 24$~~ $\boxed{3} \boxed{2} \boxed{1}$

~~$26 \times 25 \times 24$~~

$6-5 = 1$ ways ✓

8. In how many ways can you distribute a king, a Queen and a Jack card to three person?

$3P_3 = 6$ ways ✓