



Permutations Ex 16.5 Q2

There are 4 consonants in the word 'ALGEBRA'.

The number of ways to arrange these consonants = $4!$

There are 3 vowels in the given word of which 2 are A's

The vowels can be arranged among themselves in $\frac{3!}{2!}$ ways.

$$\begin{aligned}\text{Hence, the required number of arrangements} &= 4! \times \frac{3!}{2!} \\ &= 4 \times 3 \times 2 \times \frac{3 \times 2}{2} \\ &= 72\end{aligned}$$

Permutations Ex 16.5 Q3

In the word 'UNIVERSITY' there are 10 letters of which 2 are I's.

There are 4 vowels in the given word of which 2 are I's.

These vowels can be put together in $\frac{4!}{2!}$ ways.

Considering these 4 vowels as one letter there are 7 letters which can be arranged in $7!$ ways.

Hence, by fundamental principle of multiplication, the required number of arrangements is

$$\begin{aligned}&= \frac{4!}{2!} \times 7! \\ &= \frac{4 \times 3 \times 2!}{2!} \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \\ &= 4 \times 3 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \\ &= 60480.\end{aligned}$$

Permutations Ex 16.5 Q4

There are $3a's$, $2b's$ and $4c's$.

So, the number of arrangements

$$\begin{aligned}&= \frac{9!}{4!3!2!} \\ &= \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4!}{4! \times 3 \times 2 \times 2} \\ &= 9 \times 4 \times 7 \times 5 \\ &= 1260.\end{aligned}$$

Hence, the total number of arrangements are 1260.

Permutations Ex 16.5 Q5

There are 8 letters in the word 'PARALLEL' out of which A's and 3 are L's and the rest are all distinct.

$$\text{So, total number of words} = \frac{8!}{2! 3!}$$

$$= \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3!}{2 \times 1 \times 3!}$$

$$= 8 \times 7 \times 6 \times 5 \times 2$$

$$= 3360$$

Considering all L's together and treating them as one letter we have 6 letters out of which A repeats 2 times and others are distinct. These 6 letters can be arranged in $\frac{6!}{2!}$ ways.

So, the number of words in which all L's come together

$$= \frac{6!}{2!}$$

$$= \frac{6 \times 5 \times 4 \times 3 \times 2!}{2!}$$

$$= 6 \times 5 \times 4 \times 3$$

$$= 360$$

Hence, the number of words in which all L's do not come together

$$= 3360 - 360$$

$$= 3000.$$

***** END *****