

Important Permutations Formulas PDF



**Formulas
Examples
with Units**

**List of 15
Important Permutations Formulas**

1) Circular Permutation Formulas ↻

1.1) No of Circular Permutations of N Different Things taken All at once, both Orders taken as Different Formula ↻

Formula

$$P_{\text{Circular}} = (n - 1)!$$

Example

$$5040 = (8 - 1)!$$

Evaluate Formula ↻

1.2) No of Circular Permutations of N Different Things taken All at once, both Orders taken as Same Formula ↻

Formula

$$P_{\text{Circular}} = \frac{(n - 1)!}{2}$$

Example

$$2520 = \frac{(8 - 1)!}{2}$$

Evaluate Formula ↻

1.3) No of Circular Permutations of N Different Things taken R at once if both Orders taken as Different Formula ↻

Formula

$$P_{\text{Circular}} = \frac{n!}{r \cdot (n - r)!}$$

Example

$$420 = \frac{8!}{4 \cdot (8 - 4)!}$$

Evaluate Formula ↻

1.4) No of Circular Permutations of N Different Things taken R at once if both Orders taken as Same Formula ↻

Formula

$$P_{\text{Circular}} = \frac{n!}{2 \cdot r \cdot (n - r)!}$$

Example

$$210 = \frac{8!}{2 \cdot 4 \cdot (8 - 4)!}$$

Evaluate Formula ↻

2) Linear Permutation Formulas ↻

2.1) Number of Permutations of N Different Things given M Specific Things Always Come Together Formula ↻

Formula

$$P = m! \cdot (n - m + 1)!$$

Example

$$4320 = 3! \cdot (8 - 3 + 1)!$$

Evaluate Formula ↻



2.2) Number of Permutations of N Different Things given M Specific Things Never Come Together Formula

Formula

$$P = (n!) - (m! \cdot (n - m + 1)!)$$

Example

$$36000 = (8!) - (3! \cdot (8 - 3 + 1)!)$$

Evaluate Formula 

2.3) Number of Permutations of N Different Things taken All at once Formula

Formula

$$P = n!$$

Example

$$40320 = 8!$$

Evaluate Formula 

2.4) Number of Permutations of N Different Things taken Not More than R at once and Repetition Allowed Formula

Formula

$$P = \frac{n \cdot (n^r - 1)}{n - 1}$$

Example

$$4680 = \frac{8 \cdot (8^4 - 1)}{8 - 1}$$

Evaluate Formula 

2.5) Number of Permutations of N Different Things taken R at once Formula

Formula

$$P = \frac{n!}{(n - r)!}$$

Example

$$1680 = \frac{8!}{(8 - 4)!}$$

Evaluate Formula 

2.6) Number of Permutations of N Different Things taken R at once and Repetition Allowed Formula

Formula

$$P = n^r$$

Example

$$4096 = 8^4$$

Evaluate Formula 

2.7) Number of Permutations of N Different Things taken R at once given M Specific Things Always Occur Formula

Formula

$$P = r! \cdot \left(\frac{(n - m)!}{(n - r)! \cdot (r - m)!} \right)$$

Example

$$120 = 4! \cdot \left(\frac{(8 - 3)!}{(8 - 4)! \cdot (4 - 3)!} \right)$$

Evaluate Formula 

2.8) Number of Permutations of N Different Things taken R at once given M Specific Things Never Occur Formula

Formula

$$P = \frac{(n - m)!}{(n - m - r)!}$$

Example

$$120 = \frac{(8 - 3)!}{(8 - 3 - 4)!}$$

Evaluate Formula 



2.9) Number of Permutations of N Different Things taken R at once given One Specific Thing Always Occurs Formula

Formula

$$P = (r!) \cdot \frac{(n-1)!}{(n-r)! \cdot (r-1)!}$$

Example

$$840 = (4!) \cdot \frac{(8-1)!}{(8-4)! \cdot (4-1)!}$$

Evaluate Formula 

2.10) Number of Permutations of N Different Things taken R at once given One Specific Thing Never Occurs Formula

Formula

$$P = \frac{(n-1)!}{(n-1-r)!}$$

Example

$$840 = \frac{(8-1)!}{(8-1-4)!}$$

Evaluate Formula 

2.11) Number of Permutations of N Things taken All at once given R of them are Identical Formula

Formula

$$P = \frac{n!}{r!}$$

Example

$$1680 = \frac{8!}{4!}$$

Evaluate Formula 



Variables used in list of Permutations Formulas above

- **m** Value of M
- **n** Value of N
- **P** Number of Permutations
- **P_{Circular}** Number of Circular Permutations
- **r** Value of R



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