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Permutations Formulas

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List of 15 Permutations Formulas

Permutations

Circular Permutation

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

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

Open Calculator 

$$\text{ex } 5040 = (8 - 1)!$$

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

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

Open Calculator 

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

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

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

Open Calculator 

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



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

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

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

Linear Permutation

5) Number of Permutations of N Different Things given M Specific Things Always Come Together

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

[Open Calculator !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e_img.jpg\)](#)

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

7) Number of Permutations of N Different Things taken All at once

$$fx \quad P = n!$$

[Open Calculator !\[\]\(84f47badaad7772cd95667a7c387a639_img.jpg\)](#)

$$ex \quad 40320 = 8!$$



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

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

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

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

9) Number of Permutations of N Different Things taken R at once

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

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

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

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

$$\text{fx } P = n^r$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$\text{ex } 4096 = (8)^4$$



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

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

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

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



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

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

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5_img.jpg\)](#)

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



Variables Used

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



Constants, Functions, Measurements used



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