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Relations and Functions Formulas

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List of 15 Relations and Functions Formulas

Relations and Functions

Functions

1) Number of Bijective Functions from Set A to Set B

Open Calculator

fx $$N_{\text{Bijective Functions}} = n_{(A)}!$$

ex $$6 = 3!$$

2) Number of Functions from Set A to Set B

Open Calculator

fx $$N_{\text{Functions}} = \left(n_{(B)}\right)^{n_{(A)}}$$

ex $$64 = (4)^3$$

3) Number of Injective (One to One) Functions from Set A to Set B

Open Calculator

fx $$N_{\text{Injective Functions}} = \frac{n_{(B)}!}{\left(n_{(B)} - n_{(A)}\right)!}$$

ex $$24 = \frac{4!}{(4-3)!}$$

4) Number of Relations from Set A to Set B which are not Functions

Open Calculator

fx $$N_{\text{Relations not Functions}} = 2^{n_{(A)} \cdot n_{(B)}} - \left(n_{(B)}\right)^{n_{(A)}}$$

ex $$4032 = 2^{3 \cdot 4} - (4)^3$$

Relations

5) Number of Antisymmetric Relations on Set A

Open Calculator

fx $$N_{\text{Antisymmetric Relations}} = 2^{n_{(A)}} \cdot 3^{\frac{n_{(A)} \cdot \left(n_{(A)} - 1\right)}{2}}$$

ex $$216 = 2^3 \cdot 3^{\frac{3 \cdot (3-1)}{2}}$$

6) Number of Asymmetric Relations on Set A

Open Calculator

fx $$N_{\text{Asymmetric Relations}} = 3^{\frac{n_{(A)} \cdot \left(n_{(A)} - 1\right)}{2}}$$

ex $$27 = 3^{\frac{3 \cdot (3-1)}{2}}$$

7) Number of Irreflexive Relations on Set A

Open Calculator

fx $$N_{\text{Irreflexive Relations}} = 2^{n_{(A)} \cdot \left(n_{(A)} - 1\right)}$$

ex $$64 = 2^{3 \cdot (3-1)}$$

8) Number of Non Empty Relations from Set A to Set B

Open Calculator

$$N_{\text{Non Empty Relations}} = 2^{n_{(A)} \cdot n_{(B)}} - 1$$

ex $4095 = 2^{3 \cdot 4} - 1$

9) Number of Reflexive Relations on Set A

Open Calculator

$$N_{\text{Reflexive Relations}} = 2^{n_{(A)} \cdot (n_{(A)} - 1)}$$

ex $64 = 2^{3 \cdot (3-1)}$

10) Number of Relations from Set A to Set B

Open Calculator

$$N_{\text{Relations(A-B)}} = 2^{n_{(A)} \cdot n_{(B)}}$$

ex $4096 = 2^{3 \cdot 4}$

11) Number of Relations on Set A

Open Calculator

$$N_{\text{Relations(A)}} = 2^{n_{(A)}^2}$$

ex $512 = 2^{(3)^2}$

12) Number of Relations on Set A which are both Reflexive and Antisymmetric

Open Calculator

$$N_{\text{Reflexive \& Antisymmetric}} = 3^{\frac{n_{(A)} \cdot \left(n_{(A)} - 1\right)}{2}}$$

ex $27 = 3^{\frac{3 \cdot (3-1)}{2}}$

13) Number of Relations on Set A which are both Reflexive and Symmetric

Open Calculator

fx $$N_{\text{Reflexive \& Symmetric}} = 2^{\frac{n(A)\cdot\left(n(A)-1\right)}{2}}$$

ex $$8 = 2^{\frac{3\cdot(3-1)}{2}}$$

14) Number of Relations on Set A which are both Symmetric and Antisymmetric

Open Calculator

fx $$N_{\text{Symmetric \& Antisymmetric}} = 2^{n(A)}$$

ex $$8 = 2^3$$

15) Number of Symmetric Relations on Set A

Open Calculator

fx $$N_{\text{Symmetric Relations}} = 2^{\frac{n(A)\cdot\left(n(A)+1\right)}{2}}$$

ex $$64 = 2^{\frac{3\cdot(3+1)}{2}}$$

Variables Used

- $n_{(A)}$ Number of Elements in Set A
- $n_{(B)}$ Number of Elements in Set B
- $N_{\text{Antisymmetric Relations}}$ No. of Antisymmetric Relations on A
- $N_{\text{Asymmetric Relations}}$ Number of Asymmetric Relations
- $N_{\text{Bijective Functions}}$ Number of Bijective Functions from A to B
- $N_{\text{Functions}}$ Number of Functions from A to B
- $N_{\text{Injective Functions}}$ Number of Injective Functions from A to B
- $N_{\text{Irreflexive Relations}}$ Number of Irreflexive Relations
- $N_{\text{Non Empty Relations}}$ Number of Non Empty Relations from A to B
- $N_{\text{Reflexive \& Antisymmetric}}$ No. of Reflexive and Antisymmetric Relations on A
- $N_{\text{Reflexive \& Symmetric}}$ No. of Reflexive and Symmetric Relations on A
- $N_{\text{Reflexive Relations}}$ Number of Reflexive Relations on Set A
- $N_{\text{Relations not Functions}}$ No. of Relations A to B which are not Functions
- $N_{\text{Relations(A)}}$ Number of Relations on A
- $N_{\text{Relations(A-B)}}$ Number of Relations from A to B
- $N_{\text{Symmetric \& Antisymmetric}}$ No. of Symmetric and Antisymmetric Relations on A
- $N_{\text{Symmetric Relations}}$ Number of Symmetric Relations on Set A

Constants, Functions, Measurements used

Check other formula lists

- **Relations and Functions Formulas**
- **Sets Formulas**

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