

set formula lists

i want like $|A \cup B| = |A| + |B| - |A \cap B|$

Here's a concise list of key **set theory formulas** involving unions, intersections, and cardinality, presented in the style you requested:

1. Union of Two Sets

$$|A \cup B| = |A| + |B| - |A \cap B|$$

2. Union of Three Sets

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

3. Intersection and Complements

$$|A \cap B| = |A| + |B| - |A \cup B|$$

$$|A'| = |U| - |A| \quad (\text{where } U \text{ is the universal set})$$

4. Relative Complement (Difference)

$$|A - B| = |A| - |A \cap B|$$

5. Symmetric Difference

$$|A \triangle B| = |A - B| + |B - A| = |A| + |B| - 2|A \cap B|$$

6. De Morgan's Laws

$$(A \cup B)' = A' \cap B'$$

$$(A \cap B)' = A' \cup B'$$

7. Distributive Laws

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

8. Associative/Commutative Properties

- **Union:** $A \cup B = B \cup A$, $(A \cup B) \cup C = A \cup (B \cup C)$
- **Intersection:** $A \cap B = B \cap A$, $(A \cap B) \cap C = A \cap (B \cap C)$

9. Power Set Cardinality

For a set A with n elements:

$$|\mathcal{P}(A)| = 2^n$$

10. Cartesian Product

$$|A \times B| = |A| \cdot |B|$$

These formulas are foundational for solving problems in combinatorics, probability, and discrete math. Let me know if you'd like examples or deeper insights into specific applications! ☐