

Math Notes

Sets

PART 1 - Writing of Sets and Venn Diagram

Due to the limitations of the document and time, I will not be covering much on venn diagrams. However, if you need help with it, feel free to ask away.

Methods of writing sets

- All sets are in capital whereas the elements are in small case.
- Roster Notation
 - Every element is listed
 - $A = \{1,2,3,4\}$
- Stating in words
 - Rarely used
 - Used when infinite amount of elements
 - $B = \{x \text{ is a prime number}\}$
- Set Builder Notation
 - $x:x$ means x such that $x...$
 - $x:x$ must be present.
 - $C = \{x:x \text{ is off \& } 1 < x < 9000\}$
 - In roster notation, the above would list out all numbers between 1 to 9000.

In Venn Diagrams

- Remember to write the universal set symbol at the top left corner of the rectangle
- Label all sets properly
- List elements if necessary

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PART 2 - Terms, Symbols & Glossary

Terms, Symbols & Glossary

- $n(A)$ is the number of elements in set A
- \in represents an element of ...
Use: $a \in A$ - a is an element of A
- \notin represents not an element of...
- \emptyset or \mathbb{I} represents a null set or an empty set
- \mathcal{E} represents the universal sets, containing all AVAILABLE elements in the situation
- The $()'$ symbol or prime, represents the complement set of...
 - A complementary of set A is also known as A'
 - Simply, it is everything that is in the universal set and not in A
- Subsets (\subseteq) - A set that has all its elements in another set, where both sets can be equal.
 - $A \subseteq B$ - A is a subset of B, every element of A can be found in B and A can be equal to B.
 - $A = B$ if and only if $A \subseteq B$ and $B \subseteq A$.
 - All sets are subsets of the universal set.
 - Empty sets are subsets of every other sets.
 - Opposite: Not a subset ($\not\subseteq$)
- Proper Subsets (\subset) - Similar to subsets, used to represent a set that has all its elements in another set but they are not equal.
 - If $A \subset B$, $n(A) < n(B)$
 - Opposite: Not a proper subset ($\not\subset$)
- Intersection (\cap) - A set of elements common to sets written beside the symbol.
 - Usage: $A \cap B = \mathbb{I}$ - There are no common elements to both set A and B.
- Union (\cup) - A set of elements that are in both sets
 - Usage: $A \cup B$ is a set that contains all elements in set A and B
 - Common elements do NOT overlap.

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PART 3 - Notes & Glossary

Notes & Glossary

- Coordinates are counted as a single element (x,y)
- Set name is capitalised, whereas elements are in small case.
- State all rules clearly in set builder notation.
- Finite sets - Sets that will end
- Infinite sets - Sets that are neverending
- Equal sets - $A=B$
 - A and B must have same elements and same number of elements.
- Disjoint sets - Sets that have no common elements.
- $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
- $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(A \cap C) - n(B \cap C) + n(A \cap B \cap C)$
- if $A \subseteq B$
 - $A \cap B = A$ & $n(A \cap B) = n(A)$
 - $A \cup B = B$ & $n(A \cup B) = n(B)$