

ON-SETS WORKSHEET

5A

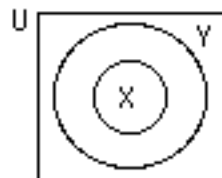
NAME _____

PRINCIPLES (MIDDLE/JUNIOR/SENIOR ONLY)

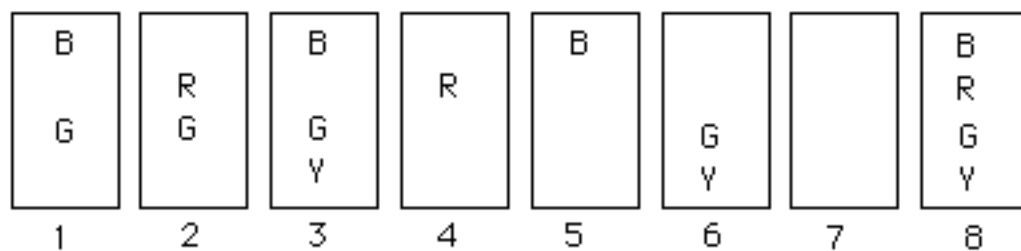
\subset means "is a subset of." For example, $R \subset B$ means "red is a subset of blue."

Definition: Set X is a subset of set Y ($X \subset Y$) if and only if every element in X is also in Y .

The subset relation can be shown in a Venn diagram. At the right the circle for X is entirely inside the circle for Y . Thus $X \subset Y$.



EXAMPLES



- For the Universe above, the statement $Y \subset G$ is true. Y consists of cards 3, 6, and 8. G is cards 1, 2, 3, 6, and 8. Every card with a Y dot also has a G dot.
- The following statements are true for every Universe.
 - $B \subset B$
 - $Y \subset G \cup Y$
 - $B \cap R \subset B$
 - $R - G \subset R$

The statement $Y \subset G \cup Y$ is equivalent to $Y \subset (G \cup Y)$. In other words, the subset sign (\subset) automatically divides the statement into a set to the left of it and a set to the right of it.

EXERCISES

Circle the number of each true statement for the Universe above.

- | | | |
|---------------------------------|--------------------------------|--------------------------|
| 1. $R \subset R$ | 2. $G' \subset G'$ | 3. $R \subset B'$ |
| 4. $G \subset B \cup G$ | 5. $R \subset G$ | 6. $G' \subset Y'$ |
| 7. $Y \cap G \subset B$ | 8. $Y \cap G \subset Y$ | 9. $G \subset B \cup Y$ |
| 10. $Y' \subset Y' \cup \Delta$ | 11. $B \cap Y \subset G$ | 12. $R - Y \subset B$ |
| 13. $B - Y \subset B$ | 14. $B - Y \subset Y$ | 15. $G - G' \subset R'$ |
| 16. $R \subset B \cup R \cup G$ | 17. $B' \subset B$ | 18. $B \subset B'$ |
| 19. $R \subset G \cup Y'$ | 20. $R \cup \Delta \subset G'$ | 21. $R \subset B \cup Y$ |

MORE CHALLENGING EXERCISES

Circle the number of each true statement.

- Any set is a subset of itself.
- Any set is a subset of the union of itself and another set.
- The intersection of two sets is a subset of each of the two sets.