

Absolute value $|a|$ = the distance from 0 to a on the real number line

Fill in the blank with $<$, $=$, or $>$.

$$|-5| \underline{\quad} 5 \qquad -13 \underline{\quad} -12 \qquad |-13| \underline{\quad} |-12|$$

Solve $|x| = 5$ for x. $x = \underline{\hspace{2cm}}$

Set = a well-defined collection of objects

$$G = \{\Delta, \triangle, \square, \diamond, \circ, \#\}$$

$$\text{U.S. Military Services} = M = \{ \underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad} \}$$

$$C = \text{States in the U.S. whose name begins with the letter C}$$

3 ways to describe a set:

(1) complete list of elements $A = \{a, b, c, d, e, f, g, \dots, x, y, z\}$

$$a \underline{\quad} A \qquad 5 \underline{\quad} A$$

(2) a phrase

the set of Math 0997 students born in June

the set of Math 0997 students with more than one pet

(3) set-builder notation

$$\{x \mid x = 2n, n \in \mathbb{N}\} = \{ \underline{\hspace{3cm}} \}$$

$$\{x \mid x = 2n - 1, n \in \mathbb{N}\} = \{ \underline{\hspace{3cm}} \}$$

$$\{x \mid x = 2^n, n \in \mathbb{W}\} = \{ \underline{\hspace{3cm}} \}$$

Cardinality of a set $n(G) = \underline{\hspace{2cm}}$ $n(M) = \underline{\hspace{2cm}}$ $n(C) = \underline{\hspace{2cm}}$

Set operations: Given a universal set, U Use Venn diagrams to “visualize”.

(1) Set Complement = the set of elements in the universal set not in the original set

$$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$A = \{0, 2, 3, 4, 6, 8, 9\} \quad A' \text{ or } \bar{A} = \underline{\hspace{4cm}}$$

$$B = \{0, 1, 4, 9\} \quad B' \text{ or } \bar{B} = \underline{\hspace{4cm}}$$

(2) Intersection

$A \cap B$ = the set of elements in A and in B Find $A \cap B$.

P = students in a PHED class

M = students in MATH class

Find $P \cap M$.

(3) Union

$C \cup D$ = the set of elements in C or in D (or in both) the “inclusive or”

$$C = \{2, 3, 4, 6, 8\} \quad C \cup D = \underline{\hspace{4cm}}$$

$$D = \{0, 1, 2, 4, 8\}$$

P = the students in a PHED class

M = the students in math class

Find $P \cup M$.

(4) Set Difference

$B - A = B \cap \bar{A}$ = the set of elements in B that are not in A

$A - B = A \cap \bar{B}$ = the set of elements in A that are not in B

Find $B - A$ and $A - B$.

Subsets

$B \subseteq A$ every element of B is an element of A $n(B) \leq n(A)$

$B \subset A$ every element of B is an element of A and $B \neq A$ $n(B) < n(A)$

Find all of the subsets of $A = \{a, b, c\}$. How many are proper?

Exercises:

1. If set $B = \{l, i, n, e, a, r\}$, find the cardinality of B. $n(B) =$ _____

Fill in the blank with the symbol (\in or \notin) that makes the statement true:

2. 5 _____ $\{0, 1, 2, 3, 4\}$

3. 16 _____ $\{x \mid x = 3n + 1, n \in \mathbb{N}\}$

4. How many subsets does the set $\{0, 1, 2, 3\}$ have? Multiple choice.

(a) 4 (b) 6 (c) 15 (d) 16 (e) None of these

List all of the 2-element subsets.

If $A = \{1, 3, 4, 7, 9\}$, $B = \{0, 1, 4, 9\}$, and the universal set $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, find

5. $A \cup B$

6. $A \cap B$

7. \bar{A}

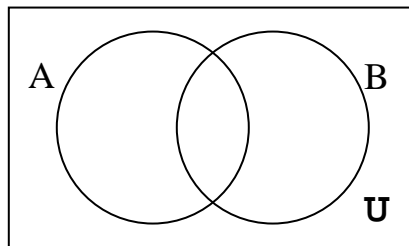
If $A = \{1, 3, 4, 7, 9\}$, $B = \{0, 1, 4, 9\}$, and the universal set $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, find

8. $A - B$

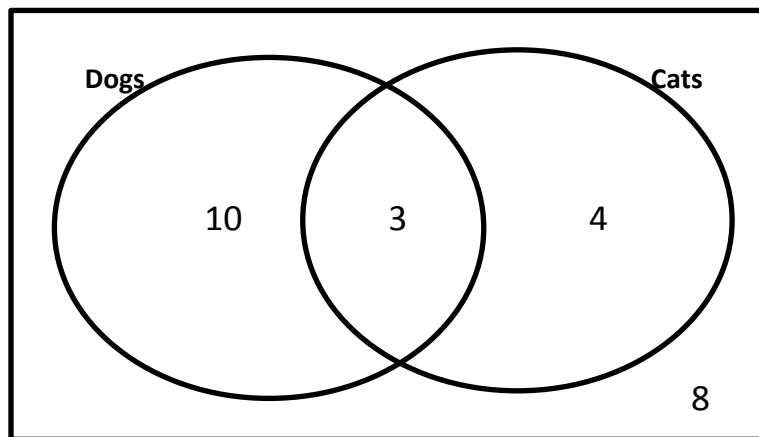
9. $\overline{(A \cup B)}$

10. $A \cup \overline{B}$

11. For #5–10, complete the following Venn diagram.



12. The Venn diagram below shows the results of a survey of 25 pet owners on whether they own dogs, cats, or other pets.



Universal Set

What percent of pet owners in the survey have dogs? Dogs or cats? Dogs and cats? Only cats?