Set Theory Questions

1. A set is a well-defined collection of distinct objects, considered as an object in its own right. Each object in a set is called an element.

2. If $A = \{2, 4, 6, 8\}$, then 4 is an element of set A.

3. If every element of set B is also an element of set A, then B is a subset of A.

4. If set B is a subset of set A, and both sets have the exact same elements, then A and B are same, equal, equivalent.

5. The universal set, often denoted as U, contains every object under consideration, and every set in the context is a subset of the universal set.

   given

6. The set $\{x \mid x \text{ is a positive integer less than } 5\}$ in set-builder notation is written as {1,2,3,4}

   {Y I Y is a positive integer less than 1000}

7. The empty set, represented by $\emptyset$, is the set that contains no element.

   belong element

8. The notation $a \in A$ means that a is an element of set A.

   $\subseteq$

9. A set with a countable number of elements is called a finite set, whereas a set with uncountable elements is called an infinite set.

10. In the set of all vowels $V = \{a, e, i, o, u\}$, the letter "e" is an element, and any consonant is not an element of set V.

11. Define a set and give an example of a set that includes three different types of fruits.

    A = {apple, banana, pear}

12. If $S = \{a, e, i, o, u\}$, does the letter 'e' belong to set S? Represent your answer using the appropriate set notation.

$e \in S$

13. Is the set of all even numbers a finite or infinite set? Explain your reasoning.

infinite, because all even numbers are infinite

14. Consider the sets $A = \{2, 4, 6, 8, 10\}$ and $B = \{4, 8\}$. Is set B a subset of set A? Justify your answer using the definition of a subset.

Yes, because they all have 4 and 8

15. If the universal set U is the set of all single-digit numbers, and $A = \{1, 2, 3\}$, what is the complement of set A?

U = {1,2,3,4,5,6,7,8,9} A' = {0, 4,5,6,7,8,9} A' = {4,5,6,7,8,9}

16. Write the set $\{1, 3, 5, 7, 9\}$ using set-builder notation.

{z I z is positive odd numbers smaller than 10}

intersect union

17. Given two sets $A = \{1, 2, 3\}$ and $B = \{3, 4, 5\}$, find $A \cap B$ and $A \cup B$.

{3} A U B = {1,2,3,4,5}

18. Give an example of a scenario where the empty set is the correct answer. Describe the scenario and represent the empty set using proper notation.

A = ∅

19. Consider a set $X = \{15, 20, 25, 30\}$. Which elements of set X are divisible by 5? List them in set notation.

| {15,20,25,30}

20. Are the sets $A = \{x \in \mathbb{N} : x \text{ is a prime number less than } 10\}$ and $B = \{2, 3, 5, 7\}$ equal? Explain your answer.

A = {2,3,5,7}

A and B are equal