

Q No 1: Make correct statements by filling in the symbol $\subset$ or $\not\subset$ in the blank spaces.

- (i) $\{2, 3, 4\} \subset \{1, 2, 3, 4, 5\}$
- (ii) $\{a, b, c\} \not\subset \{b, c, d\}$
- (iii) $\{x; x \text{ is student of class XI of your school}\} \subset \{x; x \text{ is student of your school}\}$
- (iv) $\{x; x \text{ is circle in plane}\} \not\subset \{x; x \text{ is circle in same plane with radius 1 unit}\}$
- (v) $\{x; x \text{ is a triangle in plane}\} \not\subset \{x; x \text{ is a rectangle in same plane}\}$
- (vi) $\{x; x \text{ is an equilateral } \Delta \text{ in a plane}\} \subset \{x; x \text{ is a } \Delta \text{ in plane}\}$
- (vii) $\{x; x \text{ is an even natural number}\} \subset \{x; x \text{ is an integer}\}$

Q No 2 Examine whether the following statements are True or false:

- (i) $\{a, b\} \not\subset \{b, c, a\}$: False because each element of $\{a, b\}$ is in $\{b, c, a\} \Rightarrow \{a, b\} \subset \{b, c, a\}$
- (ii) $\{a, e\} \subset \{x; x \text{ is vowel in the English alphabet}\}$
TRUE because a and e are vowels.
- (iii) $\{1, 2, 3\} \subset \{1, 3, 5\}$
FALSE $\because 2 \in \{1, 2, 3\}$ but $2 \notin \{1, 3, 5\}$
- (iv) $\{a\} \subset \{a, b, c\}$
TRUE $\because a \in \{a, b, c\}$
- (v) $\{a\} \in \{a, b, c\}$
FALSE $\because \{a\} \subset \{a, b, c\}$ not $\{a\} \in \{a, b, c\}$

Q No 3: Let $A = \{1, 2, \{3, 4\}, 5\}$. Which of following statements are incorrect and why?

- (i) $\{3, 4\} \subset A$

Incorrect $\because \{3, 4\} \in A$ as $\{3, 4\}$ is a member of A.

(ii) $\{3, 4\} \in A$

Correct.

(iii) $\{\{3, 4\}\} \subset A$

Correct.

(iv) $1 \in A$

Correct.

(v) $1 \subset A$

Incorrect $\because 1 \in A$

(vi) $\{1, 2, 5\} \subset A$

Correct.

(vii) $\{1, 2, 5\} \in A$

Incorrect.

(viii) $\{1, 2, 3\} \subset A$

Incorrect.

(ix) $\emptyset \in A$

Incorrect.

(x) $\emptyset \subset A$

Correct.

(xi) $\{\emptyset\} \subset A$

Incorrect

$\because \{\emptyset\} \subset P(A)$

Q No. 4 Write down all the subsets of the following sets.

(i) $\{a\}$

Subsets are $\emptyset, \{a\}$

(ii) $\{a, b\}$

Subsets are $\emptyset, \{a\}, \{b\}, \{a, b\}$

(iii) $\{1, 2, 3\}$

Subsets are $\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}$

(iv) $\emptyset$

Only subset of $\emptyset$ is $\emptyset$.

Q No. 5. How many element has $P(A)$ if $A = \emptyset$

Sol. Here $A = \emptyset$

and $P(A) =$ Set of all the subsets of $\emptyset = \{\emptyset\}$

$\therefore P(A)$ has 1 element

Q No. 6 Write the following as intervals:

Sol. (i) $\{x; x \in \mathbb{R}, -4 < x \leq 6\} = (-4, 6]$

(ii) $\{x; x \in \mathbb{R}, -12 < x < -10\} = (-12, -10)$

(iii) $\{x; x \in \mathbb{R}, 0 \leq x < 7\} = [0, 7)$

(iv) $\{x; x \in \mathbb{R}, 3 \leq x \leq 4\} = [3, 4]$

Q No 7: Write the following intervals in set-builder form.

Sol (i) $(-3, 0) = \{x; x \in \mathbb{R} \text{ and } -3 < x < 0\}$

(ii) $[6, 12] = \{x; x \in \mathbb{R} \text{ and } 6 \leq x \leq 12\}$

(iii) $(6, 12] = \{x; x \in \mathbb{R} \text{ and } 6 < x \leq 12\}$

(iv) $[-23, 5) = \{x; x \in \mathbb{R} \text{ and } -23 \leq x < 5\}$

Q No 8: What Universal Set(s) would you propose for each of following:
(i) The set of right triangles (ii) The set of isosceles triangles.

Sol: For (i) and (ii) Universal Set is set of all possible triangles for each of given sets.

Q No 9: Given the sets $A = \{1, 3, 5\}$, $B = \{2, 4, 6\}$ and $C = \{0, 2, 4, 6, 8\}$ which of following may be considered as Universal sets for all the three sets A, B, and C.

(i) $\{0, 1, 2, 3, 4, 5, 6\}$ (ii) $\emptyset$ (iii) $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

(iv) $\{1, 2, 3, 4, 5, 6, 7, 8\}$

Sol: (iii) Set $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ as this the Super set of all the 3 sets A, B and C

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