

# Sets

**Q1. Find whether the following collections make a set or not. Write Yes or No as answer.**

- a. The collection of all the weak students in a class \_\_\_\_\_
- b. The collection of all the students of a class who scored more than 85% in the last semester exams \_\_\_\_\_
- c. The collection of all intelligent students in a class \_\_\_\_\_
- d. The collection of the five richest people of India \_\_\_\_\_

**Q2. If B is a set of all the multiples of 11, then tick the correct statement from the following:**

- a.  $11 \in B$
- b.  $B \in 11$
- c.  $B = 11$

**Q3. Write each of the following in roster form:**

- a.  $H = \{x : x \text{ is a multiple of } 5 \text{ and } x < 40\}$

\_\_\_\_\_

- b.  $C = \{a : a \text{ is a colour in the rainbow}\}$

\_\_\_\_\_

**Q4.** The following table shows the set builder form of each of the sets given alongside. Find the error in the set builder form and write the correct set builder form in the space provided.

Set	Set builder form	Correct Set builder form
a. $A = \{P, R, I, N, C, A, L\}$	$A = \{x: x \text{ is a vowel in the word PRINCIPAL}\}$	
b. $B = \{\text{January, June, July}\}$	$B = \{x : x \text{ is a month of the year}\}$	
c. $C = \{1, 3, 5, 7, 9\}$	$C = \{x: x \text{ is an odd number and } x < 9\}$	

**Q5.** Write the following sets in descriptive form:

a.  $K = \{T, R, A, F, I, C\}$

\_\_\_\_\_

b.  $M = \{2, 3, 5, 7\}$

\_\_\_\_\_

**Q6.** Classify the following sets as Finite, Infinite, Empty or Singleton set:

a. A set of all the letters in the English alphabet: \_\_\_\_\_

b. A set of all natural numbers that are neither prime nor composite: \_\_\_\_\_

c. A set of all integers less than 3: \_\_\_\_\_

d. A set of all whole numbers less than zero: \_\_\_\_\_

**Q7.** Choose the correct universal set for the following sets:

$A = \{x : x \in \mathbb{N}, x < 5\}$

$B = \{x : x \in \mathbb{N}, x < 7 \text{ and } x > 2\}$

a.  $U = \{3, 4, 5, 6\}$

b.  $U = \{1, 2, 3, 4, 5, 6\}$

c.  $U = \{2, 3, 4, 5, 6, 7\}$

Answer: \_\_\_\_\_

**Q8. Classify the following sets as disjoint or overlapping:**

- a.  $A = \{x : x \in \mathbb{Z}\};$   
 $B = \{x : x \in \mathbb{N}\}$  : \_\_\_\_\_
- b.  $A = \{\text{set of all boys in the school}\};$   
 $B = \{\text{set of all girls in the school}\}$  : \_\_\_\_\_
- c.  $P = \{x : x \text{ is a letter in the word DELHI}\};$   
 $Q = \{x : x \text{ is a vowel in the English alphabet}\}$  : \_\_\_\_\_

**Q9. All equal sets are equivalent.**

Prove the above statement by filling in the blanks using the two sets given below:

$$A = \{x : x \text{ is an odd number less than } 6\}$$

$$B = \{x : x = 2n - 1, n \in \mathbb{N} \text{ and } n < 4\}$$

Answer: \_\_\_\_\_

Elements of A: {\_\_\_\_\_}

Elements of B: {\_\_\_\_\_}

Is  $A = B$ ? \_\_\_\_\_ (Yes/No)

$n(A) =$  \_\_\_\_\_;

$n(B) =$  \_\_\_\_\_

Is  $A \leftrightarrow B$ ? \_\_\_\_\_ (Yes/No)

**Q10. Write the cardinal number of the following sets:**

- a.  $P = \{\text{Point of intersection of two lines}\}$  : \_\_\_\_\_
- b.  $A = \{x : x = n^2, n \in \mathbb{N} \text{ and } n \leq 3\}$  : \_\_\_\_\_
- c.  $H = \{x : x = 2n, n \in \mathbb{N} \text{ and } n > 3 \text{ and } n < 10\}$  : \_\_\_\_\_
- d.  $Q = \{\text{Point of intersection of two parallel lines}\}$  : \_\_\_\_\_

# Answers

1. a. No; b. Yes; c. No; d. No

2. (a)

3. a.  $H = \{5, 10, 15, 20, 25, 30, 35\}$

b.  $C = \{\text{Violet, Indigo, Blue, Green, Yellow, Orange, Red}\}$

4.

Set	Set builder form	Correct Set builder form
a. $A = \{P, R, I, N, C, A, L\}$	$A = \{x : x \text{ is a vowel in the word 'PRINCIPAL'}\}$	$A = \{x : x \text{ is a letter in the word 'PRINCIPAL'}\}$
b. $B = \{\text{January, June, July}\}$	$B = \{x : x \text{ is a month of the year}\}$	$B = \{x : x \text{ is a month of the year beginning with J}\}$
c. $C = \{1, 3, 5, 7, 9\}$	$C = \{x : x \text{ is an odd number and } x < 9\}$	$C = \{x : x \text{ is an odd number and } x \leq 9\}$

5. a.  $K = \{\text{Letters in the word 'TRAFFIC'}\}$

b.  $M = \{\text{Single digit prime numbers}\}$

6. a. Finite; b. Singleton; c. Infinite; d. Empty

7. (b)

8. a. Overlapping; b. Disjoint; c. Overlapping

9. Elements of A:  $\{1, 3, 5\}$

Elements of B:  $\{1, 3, 5\}$

Is  $A = B$ ? Yes

$n(A) = 3$ ;  $n(B) = 3$

Is  $A \leftrightarrow B$ ? Yes

10. a. 1; b. 3; c. 6; d. 0