

# Success Key Worksheet

Std: Class 9 (Eng.& Semi)

Ch.1 Sets

Time: 1 Hr.

(Worksheet 1)

Date:

Subject: Mathematics-1

Max Marks: 20

**Q.1) Choose the correct alternative answer for each of the following questions:**

3

- 1) The best option for writing set  $A = \{x|x \text{ is a multiple of 2 and 3 and is less than 20}\}$  is \_\_\_\_\_.
- (a) {2, 4, 6, 8, 9, 10, 12, 14, 15, 18, 20}      (b) {6, 12, 18, 24, 30}
- (c) {2, 3}      (d) {6, 12, 18}
- 2) The possible subsets of  $\{x, y, z\}$  are \_\_\_\_\_.
- (a)  $\{x\}, \{y\}, \{z\}$       (b)  $\{x\}, \{y\}, \{z\}, \{xyz\}$
- (c)  $\phi, \{x\}, \{y\}, \{z\}, \{x, y\}, \{x, z\}, \{y, z\}, \{xyz\}$       (d)  $\phi, \{x\}, \{y\}, \{z\}, \{xyz\}$
- 3)  $M \cup N = \{1, 2, 3, 4, 5, 6\}$  and  $M = \{1, 2, 4\}$  then which of the following represent set N?
- (a) {1, 2, 3}      (b) {3, 4, 5, 6}      (c) {2, 5, 6}      (d) {4, 5, 6}

**Q.2) Solve the following sub questions:**

3

- 1) Write the following sets in roster form: Set of even numbers.
- 2) Write the following sets in roster form: Seven basic sounds of a sargam. (sur)
- 3) Write the following sets using rule method,  $X = \{a, e, t\}$

**Q.3) Complete the following activities and rewrite it. (Any 1)**

2

- 1) Write the following sets using listing method.
- (i) Set of prime numbers from 1 to 20.
- (ii) Names of continents of the world.
- (i)  $\{2, \square, 5, 7, \square, 13, 17, \square\}$
- (ii)  $\{\text{Africa, Antarctica, Asia, Australia, } \square, \text{North America, South America}\}$
- 2) Write the following sets using listing method and classify into finite or infinite set.
- $B = \{x \mid x \in \mathbb{N} \text{ and } 3x - 1 = 0\}$
- $B = \{x \mid x \in \mathbb{N} \text{ and } 3x - 1 = \square\}$
- $3x - 1 = \square \therefore 3x - 1 \quad x = \square$
- But  $\frac{1}{3} \notin \mathbb{N} \therefore B = \{ \}$   $\therefore B$  is  $\square$

**Q.4) Solve the following sub questions: (Any 1)**

2

- 1) Write any two sets by listing method and by rule method.
- 2) Write the following symbolic statements in words.
- (i)  $\frac{4}{3} \in \mathbb{Q}$       (ii)  $-2 \notin \mathbb{N}$
- (iii)  $P = \{p \mid p \text{ is an odd number}\}$

**Q.5) Solve the following sub questions: (Any 1)**

3

- 1) Which of the following are empty sets? Why?
- (i)  $A = \{a \mid a \text{ is a natural number smaller than zero.}\}$
- (ii)  $B = \{x \mid x^2 = 0\}$
- (iii)  $C = \{x \mid 5x - 2 = 0, x \in \mathbb{N}\}$

- 2) If  $A = \{a, b, c, d, e\}$ ,  $B = \{c, d, e, f\}$ ,  $C = \{b, d\}$ ,  $D = \{a, e\}$   
then which of the following statements are true and which are false ?

You know that  $\frac{1}{7} = 0.\overline{142857}$ . Can you predict what the decimal expansions of  $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$  are, without actually doing the long division? If so, how?

**Q.6) Solve the following sub questions: (Any 1)**

4

- 1) Take the set of natural numbers from 1 to 20 as universal set and show set X and Y using Venn diagram.  
(i)  $X = \{x \mid x \in \mathbb{N}, \text{ and } 7 < x < 15\}$   
(ii)  $Y = \{y \mid y \in \mathbb{N}, y \text{ is prime number from } 1 \text{ to } 20\}$
- 2) In a class, 8 students out of 28 have a dog as their pet animal at home, 6 students have a cat as their pet animal. 10 students have dog and cat both, then how many students do not have a dog or cat as their pet animal at home?

**Q.7) Solve the following sub questions: (Any 1)**

3

- 1) Write with reason, which of the following sets are finite or infinite.  
(i) Set of apparatus in laboratory  
(ii) Set of whole numbers  
(iii) Set of rational number
- 2) Which set of numbers could be the universal set for the sets given below?  
 $A =$  set of multiples of 5,  $B =$  set of multiples of 7.  
 $C =$  set of multiples of 12

# Success Key Worksheet

Std: Class 9 (Eng.& Semi)

Ch.1 Sets

Time: 1 Hr.

## Worksheet 1 (Answer Key)

Date:

Subject: Mathematics-1

Max Marks: 20

**Q.1) Choose the correct alternative answer for each of the following questions:**

3

1)Ans. (d) {6, 12, 18}

Set  $A = \{x|x \text{ is a multiple of 2 and 3 and is less than 20}\}$

Since  $x$  is multiple of 2 and 3 both, thus  $x$  is a multiple of 6 till 20

Hence set  $A = \{6, 12, 18\}$

2)Ans. (c)  $\phi$ ,  $\{x\}$ ,  $\{y\}$ ,  $\{z\}$ ,  $\{x, y\}$ ,  $\{x, z\}$ ,  $\{y, z\}$ ,  $\{xyz\}$

Elements in set  $\{x, y, z\}$  are 3. Possible number of subsets =  $2^3 = 8$ . Thus, subsets are  $\phi$ ,  $\{x\}$ ,  $\{y\}$ ,  $\{z\}$ ,

$\{x, y\}$ ,  $\{x, z\}$ ,  $\{y, z\}$ ,  $\{xyz\}$

3)Ans. (b) {3, 4, 5, 6}

**Q.2) Solve the following sub questions:**

3

1)Ans.  $A = \{2, 4, 6, 8\}$

2)Ans.  $D = \{sa, re, ga, ma, pa, dha, ni\}$

3)Ans.  $X = \{y | y \text{ is a letter of the word eat}\}$

**Q.3) Complete the following activities and rewrite it. (Any 1)**

2

1)Ans. (i)  $\{2, 3, 5, 7, 11, 13, 17, 19\}$

(ii)  $\{Africa, Antarctica, Asia, Australia, Europe, North America, South America\}$

2)Ans.  $B = \{x | x \in \mathbb{N} \text{ and } 3x - 1 = 0\}$

$$3x - 1 = 0 \quad \therefore 3x - 1 = 0 \quad x = \frac{1}{3}$$

But  $\frac{1}{3} \notin \mathbb{N} \quad \therefore B = \{ \} \quad \therefore B$  is finite set.

**Q.4) Solve the following sub questions: (Any 1)**

2

1)Ans.

Listing method	Rule method
$\{3, 7, 11, 13, 17, 19\}$	Set of odd prime numbers less than 20
$\{\text{Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday}\}$	Set of all days of a week

2)Ans.

(i)  $\frac{4}{3}$  belongs to set of rational numbers

(ii) -2 is not a natural number

(iii) P is a set of odd numbers

**Q.5) Solve the following sub questions: (Any 1)**

3

1)Ans. (i)  $A = \phi$

A is an empty set as there is no natural number less than zero

(ii)  $B = \{0\}$  as 0 is the only number whose square is zero

B is non empty set

(iii) Solving  $5x - 2 = 0$  for  $x$  we obtain ' $x = 2/5$ ' which is not a natural number

Therefore  $C = \phi$ , C is an empty set

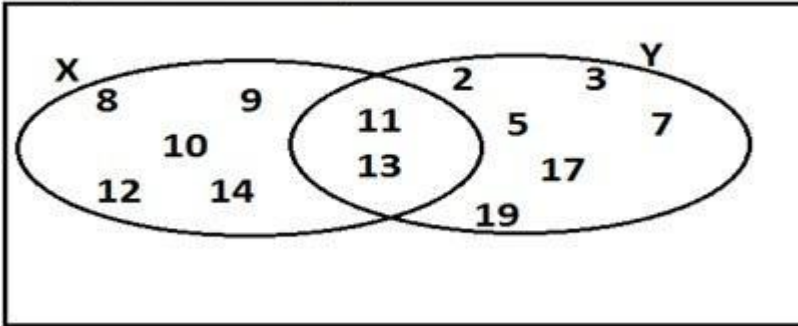
- 2)Ans. (i)  $D \subseteq A$  True  
(ii)  $B \subseteq A$  false as  $f \notin A$   
(iii)  $C \subseteq A$  true

Q.6) Solve the following sub questions: (Any 1)

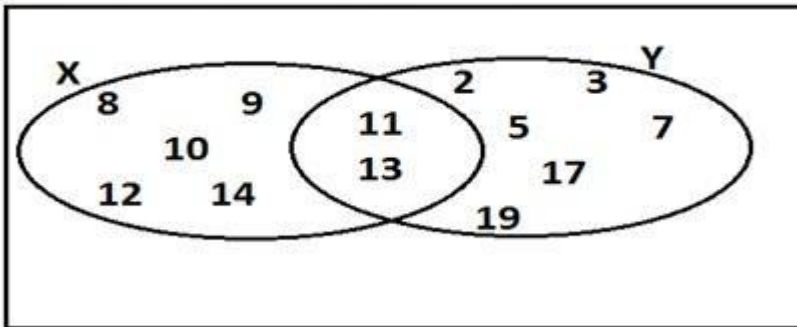
4

1)Ans.

$$X = \{8, 9, 10, 11, 12, 13, 14\}$$



$$Y = \{2, 3, 5, 7, 11, 13, 17, 19\}$$



2)Ans. Let  $n(P)$  represents the number of students having dog as pet and  $n(Q)$  represents the number of students having cat as pet.

$$n(P) = 8, n(Q) = 6, n(P \cap Q) = 10$$

$n(P \cup Q)$  = number of students having dog or cat as pet

$$n(P \cup Q) = n(P) + n(Q) - n(P \cap Q)$$

$$= 8 + 6 - 10$$

$$= 14 - 10$$

$$= 4$$

$n(P \cup Q)'$  = number of students not having dog or cat as pet

$$n(P \cup Q)' = n(U) - n(P \cup Q)$$

$$n(P \cup Q)' = 28 - 4$$

$$= 24$$

Q.7) Solve the following sub questions: (Any 1)

3

1)Ans. (i) Apparatus of a laboratory can be counted thus, Set of apparatus of laboratory is a finite set.

(ii) Set of whole numbers is a infinite set.  $W = \{0, 1, 2, 3, 4, 5, \dots\}$

(iii) There are infinite rational numbers between any two numbers, thus, set of rational numbers is infinite.

2)Ans.  $A = \{5, 10, 15, 20, \dots\}$      $B = \{7, 14, 21, 28, \dots\}$      $C = \{12, 24, 36, 48, \dots\}$

$U$  = set of multiples of 5 or 7 or 12

$$U = A \cup B \cup C$$

# Success Key Worksheet

Std: Class 9 (Eng.& Semi)

Ch.1 Sets

Time: 1 Hr.

(Worksheet 2)

Date:

Subject: Mathematics-1

Max Marks: 20

**Q.1) Choose the correct alternative answer for each of the following questions:**

3

- If  $T = \{1, 2, 3, 4, 5\}$  and  $M = \{3, 4, 7, 8\}$  then  $T \cup M = ?$ 
  - $\{1, 2, 3, 4, 5, 7\}$
  - $\{1, 2, 3, 7, 8\}$
  - $\{1, 2, 3, 4, 5, 7, 8\}$
  - $\{3, 4\}$
- $P = \{x \mid x \text{ is an odd natural number, } 1 < x \leq 5\}$  How to write this set in roster form?
  - $\{1, 3, 5\}$
  - $\{1, 2, 3, 4, 5\}$
  - $\{1, 3\}$
  - $\{3, 5\}$
- Which of the following sets is a universal set for the other three sets?
  - The set of even natural numbers
  - The set of odd natural numbers
  - The set of natural numbers
  - The set of integers

**Q.2) Solve the following sub questions:**

3

- Write the following sets in roster form: Set of even prime numbers from 1 to 50.
- Write the following sets using rule method,  
 $D = \{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$
- Write the following sets in roster form: Set of negative integers.

**Q.3) Complete the following activities and rewrite it. (Any 1)**

2

- $A = \{1, 3, 2, 7\}$  then write any three subsets of A.  
Elements in set A = 2 Number of subsets =  $2^4 = \square$   
Subsets of A are  $\phi, \{1\}, \{2\}, \{3\}, \{7\}, \{1, 2\}, \{1, 3\}, \{\square\}, \{2, 3\}, \{2, 7\}, \{\square\}, \{1, 2, 3\}, \{1, 2, 7\}, \{1, 3, 7\}, \{\square\}, \{1, 2, 3, 7\}$
- If  $n(A) = 20$ ,  $n(B) = 28$  and  $n(A \cup B) = 36$  then  $n(A \cap B) = ?$   
 $n(A \cup B) = n(A) + n(B) - n(A \cap B)$   
 $36 = 20 + 28 - \square$   
 $36 = \square - n(A \cap B)$   
 $n(A \cap B) = 48 - \square$   
 $n(A \cap B) = \square$

**Q.4) Solve the following sub questions: (Any 1)**

2

- Write the following sets using rule method,
  - $A = \{1, 4, 9, 16, 25, 36, 49, 64, 81, 100\}$
  - $B = \{6, 12, 18, 24, 30, 36, 42, 48\}$
  - $C = \{S, M, I, L, E\}$
- Decide which of the following are equal sets and which are not? Justify your answer.  
 $A = \{x \mid 3x - 1 = 2\}$   
 $B = \{x \mid x \text{ is a natural number but } x \text{ is neither prime nor composite}\}$   
 $C = \{x \mid x \in \mathbb{N}, x < 2\}$

**Q.5) Solve the following sub questions: (Any 1)**

3

1) Write the subset relations between the following sets..

X = set of all quadrilaterals.

Y = set of all rhombuses.

S = set of all squares.

T = set of all parallelograms.

V = set of all rectangles

2) 70 trees were planted by Parth and 90 trees were planted by Pradnya on the occasion of Tree Plantation Week. Out of these; 25 trees were planted by both of them together. How many trees were planted by Parth or Pradnya?

**Q.6) Solve the following sub questions: (Any 1)**

4

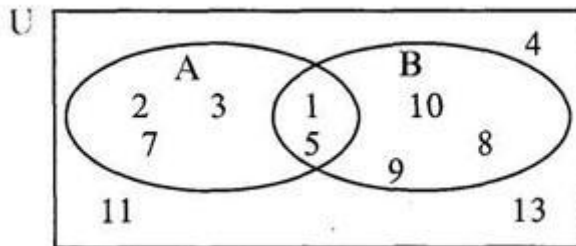
1) Out of 100 persons in a group, 72 persons speak English and 43 persons speak French. Each one out of 100 persons speak at least one language. Then how many speak only English? How many speak only French? How many of them speak English and French both?

2) In a class of 70 students, 45 students like to play Cricket. 52 students like to play Kho kho. All the students like to play at least one of the two games. How many students like to play Cricket or Kho-Kho?

**Q.7) Solve the following sub questions: (Any 1)**

3

1) Observe the Venn diagram and write the given sets U, A, B,  $A \cup B$  and  $A \cap B$ .



2) If  $A = \{a, b, c, d, e\}$ ,  $B = \{c, d, e, f\}$ ,  $C = \{b, d\}$ ,  $D = \{a, e\}$

then which of the following statements are true and which are false ?

- (i)  $C \subseteq B$  (ii)  $A \subseteq D$  (iii)  $D \subseteq B$  (iv)  $D \subseteq A$  (v)  $B \subseteq A$  (vi)  $C \subseteq A$

# Success Key Worksheet

Std: Class 9 (Eng.& Semi)

Ch.1 Sets

Time: 1 Hr.

## Worksheet 2 (Answer key)

Date:

Subject: Mathematics-1

Max Marks: 20

**Q.1) Choose the correct alternative answer for each of the following questions:**

3

1)Ans. (c) {1, 2, 3, 4, 5, 7, 8}

2)Ans. (d) {3, 5}

3)Ans. (d) The set of integers

The set on integers include even numbers, odd numbers, natural numbers, etc.

**Q.2) Solve the following sub questions:**

3

1)Ans.  $B = \{2\}$

2)Ans.  $D = \{y \mid y \text{ is a day of the week}\}$

3)Ans.  $C = \{-1, -2, -3, \dots\}$

**Q.3) Complete the following activities and rewrite it. (Any 1)**

2

1)Ans. Elements in set  $A = 2$  Number of subsets  $= 2^4 = 16$

Subsets of  $A$  are  $\phi, \{1\}, \{2\}, \{3\}, \{7\}, \{1, 2\}, \{1, 3\}, \{1, 7\}, \{2, 3\}, \{2, 7\}, \{3, 7\}, \{1, 2, 3\}, \{1, 2, 7\}, \{1, 3, 7\}, \{2, 3, 7\}, \{1, 2, 3, 7\}$

2)Ans.  $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$$36 = 20 + 28 - n(A \cap B)$$

$$36 = 48 - n(A \cap B)$$

$$n(A \cap B) = 48 - 36$$

$$n(A \cap B) = 12$$

**Q.4) Solve the following sub questions: (Any 1)**

2

1)Ans. (i) Set of square of first 10 natural numbers

(ii) Set of first 8 multiples of 6

(iii) Set of letters in the word "SMILE"

2)Ans. Since  $3x - 1 = 2$

$$3x = 2 + 1$$

$$3x = 3$$

$$x = 1$$

$$A = \{x \mid 3x - 1 = 2\} = \{1\}$$

$$B = \{x \mid x \text{ is a natural number but } x \text{ is neither prime nor composite}\} = \{1\}$$

$$C = \{x \mid x \in \mathbb{N}, x < 2\} = \{1\}$$

Therefore All three sets  $A, B$  and  $C$  are equal as they have the same number of elements and same element  $\{1\}$

**Q.5) Solve the following sub questions: (Any 1)**

3

1)Ans. Quadrilaterals are four sided closed figure. Thus, Rectangles, squares, parallelogram and rhombuses are all quadrilaterals.

Therefore,  $V \subseteq X, S \subseteq X, Y \subseteq X, T \subseteq X$

Parallelograms have opposite sides parallel. Thus, Rectangles, squares and rhombuses are all parallelograms.

$$V \subseteq T, S \subseteq T, Y \subseteq T$$

Squares are special case of rhombus,  $S \subseteq Y$

2)Ans. Let  $n(A)$  represents the number of trees planted by Parth and  $n(B)$  represents the number of trees planted by Pandya.

$$n(A) = 70, n(B) = 90, n(A \cap B) = 25$$

$n(A \cup B)$  = number of trees planted by Parth or Pandya

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$= 70 + 90 - 25$$

$$= 160 - 25$$

$$= 135$$

**Q.6) Solve the following sub questions: (Any 1)**

1)Ans. Assume that  $E$  represents the set of students who speak English,  $F$  as the set of students who speak French.

$$n(U) = 100, n(E) = 72, n(F) = 43, n(E \cup F) = 100$$

First calculate  $(E \cap F)$

$$(E \cup F) = n(E) + n(F) - n(E \cap F)$$

$$100 = 72 + 43 - n(E \cap F)$$

$$100 = 115 - n(E \cap F)$$

$$n(E \cap F) = 115 - 100$$

$$= 15$$

Now  $n(E - F)$  represent the number of students who speak English only.

$$n(E - F) = n(E) - n(E \cap F)$$

$$= 72 - 15$$

$$= 57$$

Now  $n(F - E)$  represent the number of students who speak French only.

$$n(F - E) = n(F) - n(E \cap F)$$

$$= 43 - 15$$

$$= 28$$

2)Ans. Total number of students = 70

Let  $A$  be the set of students who likes to play Cricket.

Let  $B$  be the set of students who likes to play Kho-Kho.

Hence the number of students who likes to play Cricket or Kho-kho is  $n(A \cup B)$ .

$$\therefore n(A \cup B) = 70$$

Number of students who likes to play both Cricket and Kho-kho =  $n(A \cap B)$

$$n(A) = 45, n(B) = 52$$

We know,  $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$$n(A \cap B) = n(A) + n(B) - n(A \cup B)$$

$$= 45 + 52 - 70 = 27$$

$\therefore$  Number of students who likes to play both the games are 27,

Number of students who likes to play Kho-kho are 45.

$\therefore$  Number of students who likes to play onlu Cricket =  $45 - 27 = 18$

$\therefore A \cap B$  is the set students who play both the games.

$$\therefore n(A \cap B) = 27$$

**Q.7) Solve the following sub questions: (Any 1)**

1)Ans.  $U = \{1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13\}$

$$A = \{1, 2, 3, 5, 7\}$$

$$B = \{1, 5, 8, 9, 10\}$$

$$A \cup B = \{1, 2, 3, 5, 7, 8, 9, 10\}$$

$$A \cap B = \{1, 5\}$$

2)Ans. (i)  $C \subseteq B$  false as  $b \notin B$

(ii)  $A \subseteq D$  false as  $\{b, c, d\} \notin D$

(iii)  $D \subseteq B$  false as  $a \notin B$