MATHS

NCERT - NCERT MATHEMATICS (Bengali)

SETS

Example

1. Let A={2,5,6,8} and B={5,7,9,1}. Find $A \cup B$

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2. Let A={a,e,l,o,u} and B={a,l,u}. Show that

$A \cup B = A$

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3. If A={1,2,3,4} and B={2,4,6,8}. Find $A \cup B$

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4. Find $A \cap B$ when A={5,6,7,8} and B={7,8,9,10}

5. If A={1,2,3} and B={3,4,5} then illustrate $A \cap B$

in Venn- diagrams.

6. Let A={1,2,3,4,5}, B={4,5,6,7}. Find A-B.

7. If A={p,q,r} and B={q,p,r}. Then check whether

A=B or not.

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8. If A={1,2,3...} and N is the set of natural

numbers, then check whether A and N are

equal?

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9. Consider the sets A ={p,q,r,s} and B={1,2,3,4}. Are they equal?

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10. Let A be the set of prime number smaller than 6 and B be the set of prime factors of 30. Check if A and B are equal.

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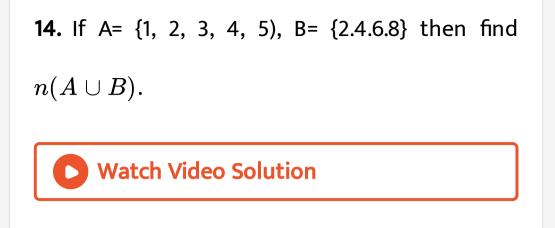**11.** Show that the sets C and B are equal, where

C={ x : x is a letter in the word 'ASSASSINATION'}

B={x : x is a letter in the word STATION}

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12. Consider the sets

$\phi, A = \{1, 3\}, B = \{1, 5, 9\}, C = \{1, 3, 5, 7, 9\}$

. Insert the symbol $\subset$ or $\not\subset$ between each

of the following pair of sets.

(i) ϕ.... B (ii) A....B (iii) A.....C (iv) B.....C

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13. State which of the following sets are finite or infinite.

(i) $\{x : x \in N$ and $(x - 1)(x - 2) = 0\}$ (ii) $\{x : x \in N$ and $x^2 = 4\}$

(iii) $\{x : x \in N$ and $2x - 2 = 0\}$ (iv) $\{x : x \in N$ is prime$\}$

(v) $\{x : x \in N$ and x is odd$\}$

14. If A= {1, 2, 3, 4, 5), B= {2.4.6.8} then find $n(A \cup B)$.

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Exercise 2 1

1. Which of the following are sets? Justify your answer

(i) The collection of all the months of a year begining with the letter "J".

(ii) The collection of ten most talented writers

of India.

(iii) A team of eleven best cricket batsmen of the world.

(iv) The collectionofall boys in your class.

(v) The collection of all even integers.

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2. If A={0,2,4,6}, B={3,5, 7} and C={p, q, r}, then fill the appropriate symbol $\in$ or $\notin$ or in the blanks

(i) 0.....A (ii) 3....C (iii) 4....B

(iv) 8....A (v) p....C (vi) 7.....B

3. Express the following statements using symbols.

(i) The element 'x' does not belong to 'A'.

(ii) d' is an element of the set 'B'.

(iii) 'I' belongs to the set of Natural numbers.

(iv) '8' does not belong to the set of prime numbers P.

4. State whether the following statements are true or false. Justify your answer

(i) $5 \notin$ set of prime numbers

(ii) S={5,6,7} implies $8 \in S$.

(iii) $-5 \notin W$ where 'W' is the set of whole numbers

(iv) $\dfrac{8}{11} \in Z$ where's 'Z' is the set of integers.

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5. Write the following sets in roster form

(i) B= {x:x is a natural number smaller than 6}

C= {x:x is a two-digit natural number such that the sum of its digits is 8).

(iii) D= {x : x is a prime mimber which is a divisor of 60}.

E= {x:x is an alphabet in BETTER}.

6. Write the following sets in the set-builder form

(i) {3,6,9,12} (ii) {2,4,8,16,32}

(iii) {5,25,125,625} (iv) {1,4,9,16,25,100}

7. Write the following sets in roster form

(i) A={ x : x is a natural number greater than 50

but smaller than 100}

B={x : x is an integer, $x^2 = 4$}

(iii) D={x : x is a letter in the word "LOYAL"}

8. Match the roster form with set builder form.

(i) {1,2,3,6} (a) {x : x is prime number and a

divisior of 6}

(ii) {2,3} (b) {x : x is an odd natural number smaller than 10}

(iii) {m,a,t,h,e,l,c,s} (c) {x : x is a natural number and divisor of 6}

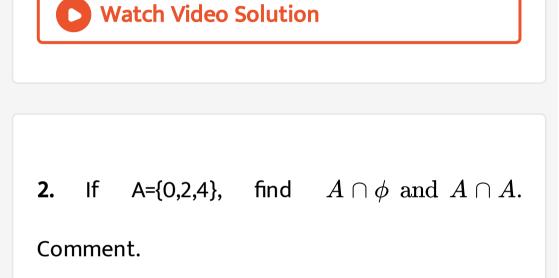(iv) {1,3,5,7,9} (d) {x : x is a letter of the word MATHEMATICS}

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Exercise 2 2

1. If A={1,2,3,4} and B={1,2,3,5,6}, then find $A \cap B$ and $B \cap A$. Are they equal.

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2. If A={0,2,4}, find $A \cap \phi$ and $A \cap A$. Comment.

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3. If A={2,4,6,8,10} and B={3,6,9,12,15}. Find A-B and B-A.

4. If A and B are two sets such that $A \subset B$ then what is $A \cup B$?

5. Let A={x : x is a natural number}, B ={x : x is an even natural number}

C={x : x is an odd natural number and D={x : x is a prime number}

Find

$A \cap B, A \cap C, A \cap D, B \cap C, B \cap D$ and $C \cap D$

.

6. If A={3,6,9,12,15,18,21}, B={4,8,12,16,20}

C={2,4,6,8,12,14,16} and D={5,10,15,20}, find

(i) A-B (ii) A-C (iii) A-D (iv) B-A (v) C-A

(vi) D-A (vii) B-C (viii) B-D (ix) C-B (x) D-B

7. State whether each of the following statements is true or false. Justify your answers.

(i) {2,3,4,5} and {3,6} are disjoint sets.

(ii) {a,e,l,o,u} and {a,b,c,d} are disjoint sets.

(iii) {2,6,10,14} and {3,7,11,15} are disjoint sets.

(iv) {2,6,10} and {3,7,11} are disjoint sets.

1. Which of the following sets are equal?

A={x : x is a letter in the word FOLLOW}, B={x : x is a letter in the word FLOW} and C={x : x is a letter in the word WOLF}

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2. Consider the following sets and fill up the blanks with $=$ or $\neq$ so as to make the

statement true.

A={1,2,3} B={The first three natural numbers}

C={a,b,c,d} D={d,c,a,b}

E={a,e,I,o,u} F={sets of vowels in English Alphabet}

(i) A....B (ii) A...E (iii) C....D

(iv) D....F (v) F....A (vi) D.....E (vii) F.....B

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3. In each of the following, state whether A=B or not.

(i) A={a,b,c,d} B={d,c,a,b}

(ii) A={4,8,12,16} B={8,4,16,18}

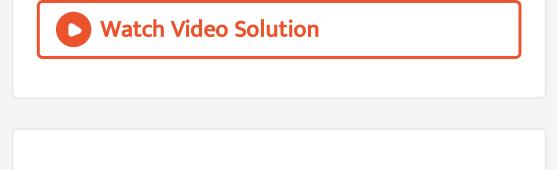(iii) A={2,4,6,8,10} B={x : x is a positive even integer and $x < 10$}

(iv) A={x : x is a multiple of 10} B={10, 15, 20, 25 30...}

4. State the reasons for the following :

(i) {1,2,3.....10} $\neq \{x : x \neq N \text{ and } 1 < x < 10\}$

(ii) {2,4,6,8,10} $\neq \{x : x = 2n + 1 \text{ and } x \neq N\}$

(iii) {5,15,30,45} $\neq$ {x : x is a multiple of 15}

(iv) {2,3,5,7,9} $\neq$ {x : x is a prime number}

5. List all the subsets of the following sets.

(i) B={p,q} (ii) C={x,y,z} (iii) D={a,b,c,d} (iv) E= {1,4,9,16} (v) F={10,100,1000}

Exercise 2 4

1. State which of the following sets are empty and which are not?

(i) The set of lines passing through a given point.

(ii) Set of odd natural numbers divisible by 2.

(iii) $\{x : x$ is a natural number, $x < 5$ and $x > 7\}$

(iv) {x : x is a common point to any two parallel lines}

(v) Set of even prime numbers.

2. State whether the followmg sets are finite or infinite.

(i) The set of months in a year. (ii) {1,2,3, ..., 99, 100)

(iii) The set of prime numbers smaller than 99.

(iv) The set of letters in the English alphabet.

(v) The set of lines that can be drawn are parallel to the X-Axis

(vi) The set of numbers which are muitiplies of 5.

(vii) The set of circles passing through the origin (0,0).
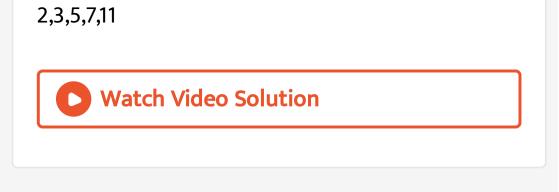
Do This

1. Identify and write the "common property" of the following collectons.

2,4,6,8

2. Identify and write the "common property" of the following collectons.

2,3,5,7,11

3. Identify and write the "common property" of the following collectons.

1,4,9,16....

4. Identify and write the "common property" of the following collectons.

January, February, March, April,....

5. Identify and write the "common property" of the following collectons.

Thumb, index finger, middle finger, ring finger, pinky.

6. Write the following sets:

Set of the first five positve integers.

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7. Write the following sets:

Set of multiples of 5 which are more than 100 and less than 125

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8. Write the following sets:

Set of first five cubic numbers.

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9. Write the following sets:

Set of digits in the Ramanujan number.

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10. Give an example of a singleton set.

11. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.

0

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12. Some numbers are give below. Decide the numbers to which numbers sets they belong to

and does not belong to and express with correct symbols.

-4

13. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.

$$\frac{5}{6}$$

14. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.

1. $\bar{3}$

15. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with

correct symbols.

$$\sqrt{2}$$

16. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.
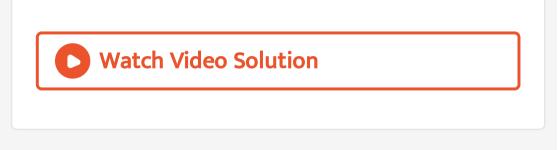
log 2

17. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.

0.03

18. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with

correct symbols.

π

19. Some numbers are give below. Decide the numbers to which numbers sets they belong to and does not belong to and express with correct symbols.

$\sqrt{-4}$

20. List the elements the following sets.

(i) G={all the factors of 20}

(ii) F={multiples of 4 between 17 and 61 which are divisible by 7?

(iii) S={x : x is a letter in the word 'MADAM'"}

(iv) P={x : x is a whole number between 3.5 and 6.7}

21. Write the following sets in the roster form.

(i) B is the set of all months in a year having 30

days.

(ii) P is the set of all prime numbers smaller than 10.

(iii) X is the set of colours of the rainbow.

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22. A is the set of factors of 12. Which one of the following is not a member of A.

(A) 1 (B) 4 (C) 5 (D) 12

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23. A={1,2,3,4}, B={2,4}, C={1,2,3,4,7}, F={}.

Fill in the blanks with $\subset$ or $\not\subset$

(i) A.....B (ii) C.....A (iii) B.....A
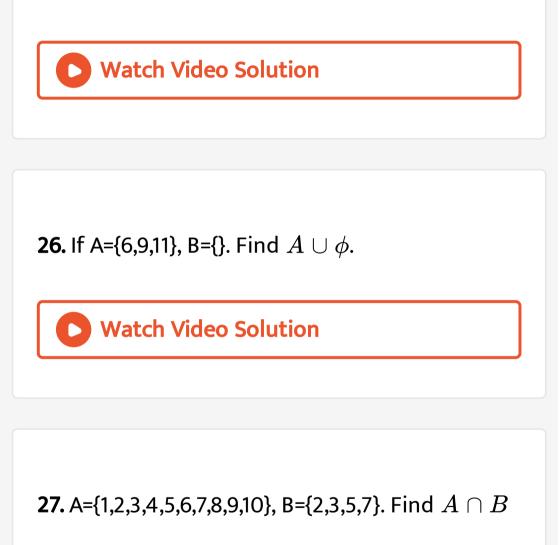
(iv) A.....C (v) B.....C (vi) ϕ...B

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24. State which of the following statement are true.

(i) {} $= \phi$ (ii) $\phi = 0$ (iii) $0 = \{0\}$

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25. Let A={1,3,7,8} and B={2,4,7,9}. Find $A \cap B$

26. If A={6,9,11}, B={}. Find $A \cup \phi$.

27. A={1,2,3,4,5,6,7,8,9,10}, B={2,3,5,7}. Find $A \cap B$

28. If A={4,5,6}, B={7,8} then show that

$A \cup B = B \cup A$

29. If A={1,2,3,4,5} and B={4,5,6,7}, then find A-B and B-A. Are they equal?

30. If V={a,e,I,o,u} and B={a,I,k,u}. Find V-B and B-V.

31. Which of the following are empty sets? Justify your answer.

(i) Set of integer which lie between 2 and 3.

(ii) Set of natural numbers that are smaller than 1.

(iii) Set of odd numbers that leave remainder zero, when divided by 2.

32. State which of the following sets are finite and which are infinite. Give reasons for your answer.

(i) $A = \{x : x \in N \text{ and } x < 100\}$ (ii) $B = \{x : x \in N \text{ and } x \leq 5\}$

(iii) $C = \{1^2, 2^2, 3^2, ... \}$ (iv) D={1,2,3,4}

(v) {x : x is a day of the week}

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33. Tick the set which is infinite

(A) The set of whole numbers < 10 (B) The set

of prime numbers < 10

(C) The set of integers < 10 (D) The set of
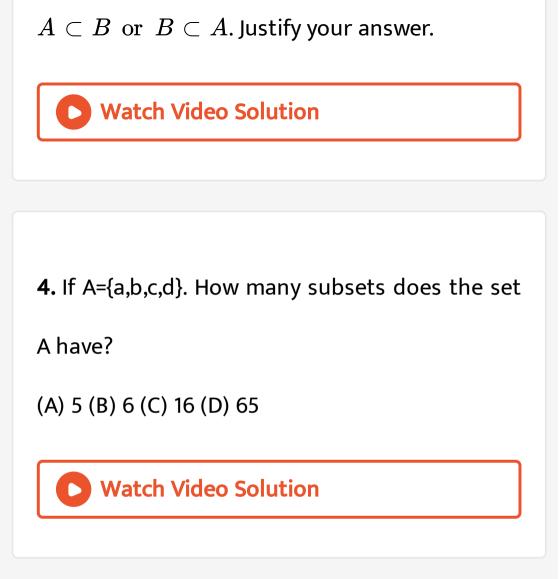
factors of 10

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Try This

1. Write some sets of your choice, involving

algebraic and geometrical ideas.

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2. Match roster forms with the set builder form.

(i) {p,r,l,n,c,a,l} (a) {x : x is a positive integer and is a divisor of 18}

(ii) {0} (b) {x : x is an integer and $x^2 - 9 = 0$}

(iii) {1,2,3,6,9,18} (c) {x : x is an integer and x+1=1}

(iv) {3,-3} (d) {x : x is a letter of the word PRINCIPAL}

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3. A ={set of quadrilaterals}, B={square, rectangle, trapezium, rhombus}. State whether

$A \subset B$ or $B \subset A$. Justify your answer.

4. If A={a,b,c,d}. How many subsets does the set

A have?

(A) 5 (B) 6 (C) 16 (D) 65

5. P is the set of factors of 5, Q is the set of

factors of 25 and R is the set of factors of 125.

Which of the following is false?

(A) $P \subset Q$ (B) $Q \subset R$ (C) $R \subset P$ (D) $P \subset R$

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6. A is the set of prime number less than 10, B is the set of odd numbers less than 10 and C is the set of even numbers of less than 10. Which of the following statements are true?

(i) $A \subset B$ (ii) $B \subset A$ (iii) $A \subset C$ (iv) $C \subset A$ (v) $B \subset C$ (vi) $\phi \subset A$

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7. List out some sets A and B and choose their elements such that A and B are disjoint.

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8. If A={2,3,5}. Find $A \cup \phi$ and $\phi \cup A$ and compare.

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9. If A={1,2,3,4} and B={1,2,3,4,5,6,7,8}, then find $A \cup B$ and $A \cap B$. What do you notice about the result?

10. Let A={1,2,3,4,5,6} and B={2,4,6,8,10}. Find the intersection of A and B.

11. Which of the following sets are empty sets?

Justify your answer.

(i) $A = \{x : x^2 = 4 \text{ and } 3x = 9\}$

(ii) The set of all triangles in a plane having the sum of their three angles less than 180.

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