



# MATHS

## BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

### SETS

#### Examples

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

i.  $\{3,6,9,12\}$  ii.  $\{2,4,8,16,32\}$

$\{5,25,125,625\}$  iv.  $\{2,4,6, \dots\}$

$\{1,4,9, \dots, 100\}$



**Watch Video Solution**

2. Write the solution set of the equation  $x^2 + x - 2 = 0$  in roster form.



**Watch Video Solution**

3. Which of the following sets are finite or infinite?

i. The set of months of a year

ii.  $\{1, 2, 3, \dots\}$

iii.  $\{1, 2, 3, \dots, 99, 100\}$

The set of positive integers  $> 100$

v. The set of prime numbers  $< 99$



**Watch Video Solution**

4. Let  $A$ ,  $B$  and  $C$  be three sets. If  $A \in B$  and  $B \subset C$ , is true that  $A \subset C$ ? If not give an example.



**Watch Video Solution**

5. Consider the set  $A = \{a, b, c\}$

i. How many elements are there in its power set  $P(A)$ ?

Write the power set  $P(A)$ .



**Watch Video Solution**

6. If  $X = \{a, b, c, d\}$  and  $Y = \{f, b, d, g\}$ , find

i.  $X - Y$

ii.  $Y - X$

iii.  $X \cap Y$



Watch Video Solution

7. If  $R$  is the set of real numbers and  $Q$  is the set of rational numbers, then what is  $RQ$ ?



Watch Video Solution

8. Let  $A = \{x : x \text{ is a prime number } < 10\}$  and  $B = \{1, 2, 3, 4\}$

i. Write A in tabular form.

ii. Find  $A - B$  and  $B - A$ .

iii. Find  $(A - B) \cup (B - A)$



**Watch Video Solution**

9. Consider sets A and B given by

$A = \{x : x \text{ is a prime number } < 10\}$

$B = \{x : x \text{ is a natural number which divides } 12\}$

i. Write A and B in roster form.

ii. Find  $A \cup B$  and  $B-A$ .

iii. Verify that  $(A \cup B)-A = B-A$ .



**Watch Video Solution**

**10.** Let  $A=\{x:x \in \mathbb{R}, x^2-5x+6=0\}$  and  $B=\{x:x \in \mathbb{R}, x^2 = 9\}$

i. Write A and B in roster form.

ii. Find  $A \cup B$  and  $A \cap B$ .

Find  $A-B$ ,  $B-A$  and verify that  $(A-B) \cup (B-A)=(A \cup B)-(A \cap B)$ .



**Watch Video Solution**

**11.** If  $U=\{a,b,c,d,e,f,g,h\}$ , find the complements of the following sets:

i.  $A=\{a,b,c\}$  ii.  $B=\{d,e,f,g\}$

iii.  $C=\{a,c,e,g\}$  iv.  $D=\{f,g,h,a\}$



**Watch Video Solution**

**12.** Given that  $U=\{1,2,3,4,5,6,7,8\}$

$A=\{3,4,5\}$ ,  $B=\{5,6,7\}$  then find  $A' \cap B'$ .



**Watch Video Solution**



**13.** Let  $U=\{1,2,3,4,5,6,7,8\}$ ,  $A=\{2,4,6,8\}$  and  $B=\{2,4,8\}$

a. Find  $A'$  and  $B'$  b. Also find  $(A \cup B)'$  c. Verify  $(A \cup B)' = A' \cap B'$



**Watch Video Solution**

**14.** Using Venn diagram, prove the following

i.  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$  ii.  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$



**Watch Video Solution**

15. If  $A=\{1\}$ ,  $B=\{\{1\},2\}$ ,  $C=\{\{1\},3\}$ ,  $U=\{\{1\},\{2\},\{3\},1,2,3\}$ ,

then find

i.  $A \cap B$

ii.  $B \cap C$

iii.  $n((A \cap B)' \cup (B \cap C)')$



**Watch Video Solution**

16. Let  $U=\{x|x \text{ is an integer, } -4 \leq x \leq 4\}$ . Write  $A$  in roster form.

ii. Verify that  $(A \cup B)' = A' \cap B'$ .

Write the power set of  $A \cap B$ .



**View Text Solution**

**17.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is an even natural number}\}$



**Watch Video Solution**

**18.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is an odd natural number}\}$



**Watch Video Solution**

**19.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is a positive multiple of } 3\}$



[Watch Video Solution](#)

**20.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is a prime number}\}$

[Watch Video Solution](#)

**21.** Taking the set of natural numbers as the universal set, write down the complement of

the set:

$\{x: x \text{ is a natural number divisible by 3 and 5}\}$



**Watch Video Solution**

**22.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is a perfect square}\}$



**Watch Video Solution**

**23.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x \text{ is a perfect cube}\}$



**Watch Video Solution**

**24.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$\{x: x+5=8\}$



[Watch Video Solution](#)

**25.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$$\{x: 2x+5=9\}$$

[Watch Video Solution](#)

**26.** Taking the set of natural numbers as the universal set, write down the complement of



the set:

$$\{x:x \geq 7\}$$



**Watch Video Solution**

**27.** Taking the set of natural numbers as the universal set, write down the complement of the set:

$$\{x:x \in \mathbb{N} \text{ and } 2x+1 > 10\}$$



**Watch Video Solution**

**28.** Let  $U$  be the set of all triangles in a plane. If  $A$  is the set of all triangles with atleast one angle different from  $60^\circ$ , what is  $A'$ ?



**Watch Video Solution**

**29.** If  $X$  and  $Y$  are two sets such that  $n(X)=15$ ,  $n(Y)=20$  and  $n(X \cup Y)=30$ , find  $n(X \cap Y)$ .



**Watch Video Solution**

**30.** In a group of 400 people, 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English?



**Watch Video Solution**

**31.** In a group of 300 members, 200 can speak English and 150 can speak Malayalam. How many members can speak both languages? Indicate the answer using a Venn diagram.



**Watch Video Solution**

**32.** In a committee, 50 people speak French and 20 speak Spanish and 10 speak both French and Spanish. How many people speak atleast one of these two languages?



**Watch Video Solution**

**33.** In a class of 60 students 40 passed in English, 35 failed in Mathematics. How many students passed both in English and Mathematics.



[Watch Video Solution](#)

**34.** In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.



[Watch Video Solution](#)

**35.** In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teachers teach mathematics and 4 teachers teach both physics and mathematics. How many of these teachers teach physics?



**Watch Video Solution**

**36.** In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like

tennis only and not cricket? How many like tennis?



**Watch Video Solution**

**37.** A College awarded 38 nedals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got nedals in all three sports, how many received medals in exactly two of the three sports?



**Watch Video Solution**

**38.** Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct?



**Watch Video Solution**

**39.** If  $X$  and  $Y$  are two sets such that  $X \cup Y$  has 18 elements,  $X$  has 8 elements and  $Y$  has 15 elements, how many elements does  $X \cap Y$  have?



**Watch Video Solution**



**40.** If  $S$  and  $T$  are two sets such that  $S$  has 21 elements,  $T$  has 32 elements, and  $S \cap T$  has 11 elements, how many elements does  $S \cup T$  have?



**Watch Video Solution**

**41.** If  $X$  and  $Y$  are two sets such that  $X$  has 40 elements,  $X \cup Y$  has 60 elements and  $X \cap Y$  has 10 elements, how many elements does  $Y$  have?



[Watch Video Solution](#)

**42.** In a group of 70 people, 37 like coffee, 52 like tea and each person likes atleast one of the two drinks. How many people like both coffee and tea?



[Watch Video Solution](#)

**43.** Show that the following four conditions are equivalent:

i.  $A \subset B$  ii.  $A - B = \phi$

iii.  $A \cup B = B$  iv.  $A \cap B = A$



[Watch Video Solution](#)

**44.** Show that if  $A \subset B$ , then  $C - B \subset C - A$ .



[Watch Video Solution](#)

**45.** Assume that  $P(A) = P(B)$ . Show that  $A = B$ .



[Watch Video Solution](#)

**46.** Is it true for any sets  $A$  and  $B$ ,  $P(A) \cup P(B) = P(A \cup B)$ ? Justify your answer.



**Watch Video Solution**

**47.** Show that for any sets  $A$  and  $B$ ,  $A = (A \cap B) \cup (A \cap B')$  since  $A - B = A \cap B'$



**Watch Video Solution**

**48.** Using properties of sets, show that (i)  $A \cup (A \cap B) = A$  (ii)  $A \cap (A \cup B) = A$ .



**Watch Video Solution**

**49.** Show that  $A \cap B = A \cap C$  need not imply  $B = C$ .



**Watch Video Solution**

**50.** Let  $A$  and  $B$  be sets. If  $A \cap X = B \cap X = \phi$  and  $A \cup X = B \cup X$  for some set  $X$ , show that  $A = B$ .

(Hints  $A=A \cap (A \cup X)$ ,  $B=B \cap (B \cup X)$  and use distributive law)



[Watch Video Solution](#)

**51.** Find sets  $A$ ,  $B$  and  $C$  such that  $A \cap B$ ,  $B \cap C$  and  $A \cap C$  are non-empty sets and  $A \cap B \cap C = \phi$ .



[Watch Video Solution](#)

**52.** In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?



**Watch Video Solution**

**53.** In a group of students, 100 students know Hindi, 50 know English and 25 know both. Each

of the students knows either Hindi or English.

How many students are there in the group?



**Watch Video Solution**

**54.** In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find

i. the number of people who read atleast one of the newspapers.



ii. the number of people who read exactly one newspaper.



**Watch Video Solution**

**55.** In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only.



**Watch Video Solution**

**56.** Given  $U=\{1,2,3,4,5,6,7,8,9,10\}$

$A=\{1,2,3,4,5\}$ ,  $B=\{3,4,5,6\}$

i. Write  $A \cup B$ .

ii. Verify whether  $(A \cup B)' = A' \cap B'$

iii. Verify whether  $n(A \cup B) = n(A-B) + n(A \cap B) + n(B-A)$



**Watch Video Solution**

**57.** If  $U=\{1,2,3,4,5,6,7,8,9\}$ ,  $A=\{2,4,6,8\}$  and  $B=\{2,3,5,7\}$ .

Verify that

i.  $(A \cup B)' = A' \cap B'$

ii.  $(A \cap B)' = A' \cup B'$



Watch Video Solution

**58.** Draw appropriate Venn diagram for each of the following:

i.  $(A \cup B)'$  ii.  $A' \cap B'$

iii.  $(A \cap B)'$  iv.  $A' \cup B'$



Watch Video Solution

**59.** Which of the following pairs of sets are disjoint

i.  $\{1,2,3,4\}$  and  $\{x:x \text{ is an natural number and } 4 \leq x \leq 6\}$

ii.  $\{a,e,i,o,u\}$  and  $\{c,d,e,f\}$

iii.  $\{x:x \text{ is an even integer}\}$  and  $\{x:x \text{ is an odd integer}\}$



**Watch Video Solution**

**60.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an

example.

If  $x \in A$  and  $A \in B$ , then  $x \in B$



**Watch Video Solution**

**61.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an example.

If  $A \subset B$  and  $B \in C$ , then  $A \in C$



**Watch Video Solution**

**62.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an example.

If  $A \subset B$  and  $B \subset C$ , then  $A \subset C$



**Watch Video Solution**

**63.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an example.

If  $A \not\subset B$  and  $B \not\subset C$ , then  $A \not\subset C$



[Watch Video Solution](#)

**64.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an example.

if  $x \in A$  and  $A \not\subset B$ , then  $x \in B$

[Watch Video Solution](#)

**65.** Determine whether the statement is true or false. If it is true, prove it. If it is false, give an

example.

If  $A \subset B$  and  $x \notin B$ , then  $x \notin A$



Watch Video Solution

## Exercise

1. The set  $A = \{x : x \in \mathbb{R}, x^2 = 16 \text{ and } 2x = 6\}$  is

A.  $\phi$

B.  $\{1, 2\}$

C.  $\{3\}$



D.  $\{4, -4\}$

**Answer: A**



**Watch Video Solution**

2. If A and B are two sets then  $A \cup B = A \cap B$  if and only if

A.  $A \subseteq B$

B.  $B \subseteq A$

C.  $A = B$

D.  $A \neq B$

**Answer: C**



**Watch Video Solution**

**3. Let A and B be two sets. Then  $A-B$  equals**

A.  $A \cap B^c$

B.  $A^c \cap B$

C.  $A \cap B$

D.  $A' \cap B'$

**Answer: A**



**Watch Video Solution**

**4.** A set has  $n$  elements, then the total number of subsets of  $A$  is

A.  $n$

B.  $n^2$

C.  $2^n$

D.  $2^{n+1}$

**Answer: C**



**Watch Video Solution**

5. If  $A, B, C$  are three sets such that  $A \cup B = A \cup C$  and  $A \cap B = A \cap C$ , then

A.  $A = B$

B.  $B = C$

C.  $A \subset B$

D.  $B \subset A$

**Answer: B**



**Watch Video Solution**

**6.** Sets  $A$  and  $B$  have 3 and 6 elements respectively. What is the minimum number of elements in  $A \cup B$ ?

A. 3

B. 6

C. 9

D. 18

**Answer: B**



**Watch Video Solution**

7. The number of proper subsets of  $\{1,2,3\}$  is

A. 8

B. 7

C. 6

D. 5

**Answer: B**



Watch Video Solution

8. Two finite sets have  $m$  and  $n$  elements. The total number of subsets of the first set is 48 more than the total number of subsets of the second set. Then  $m$  and  $n$  are

A. 7,6

B. 6,3

C. 6,4

D. 7,4

**Answer: C**



**Watch Video Solution**

**9. If A, B and C are non empty sets, then  $(A-B) \cup (B-A)$  equals**

**A.  $(A \cup B) - B$**

**B.  $A - (A \cap B)$**

**C.  $(A \cup B) - (A \cap B)$**

**D.  $(A \cap B) \cup A \cup B$**



**Answer: C**



**Watch Video Solution**

**10.**  $A=\{1,2,3\}$ ,  $B=\{3,4\}$ ,  $C=\{4,5,6\}$  then  $A \cup (B \cap C)$  is

A.  $\{3\}$

B.  $\{1,2,3,4\}$

C.  $\{1,2,4,5\}$

D.  $\{1,2,3,4,5,6\}$

**Answer: B**



**Watch Video Solution**

**11.** In a class of 100 students, 55 have passed in mathematics and 67 have passed in Physics. Then the number of students who have passed in Physics only is

A. 22

B. 33

C. 10

D. 45

**Answer: D**



**Watch Video Solution**

**12.** Out of 800 boys in a school, 224 played cricket, 240 played hockey and 336 played basketball. Of the total 64 played both basketball and hockey, 80 played cricket and basketball and 40 played cricket and hockey,

24 played all the three games. The number of boys who did not play any game is

A. 128

B. 216

C. 210

D. 160

**Answer: D**



**Watch Video Solution**

**13.** In a college of 300 students, every student reads 5 newspapers and every newspaper is read by 60 students. The number of newspaper is

A. atleast 30

B. atmost 20

C. exactly 25

D. exactly 30

**Answer: C**



**Watch Video Solution**

14. If  $A$  and  $B$  are two given sets then  $A \cap (A \cap B)^c$  is equal to

A.  $A$

B.  $B$

C.  $\phi$

D.  $A \cap B^c$

**Answer: D**



[Watch Video Solution](#)

15. Let  $n(U)=700$ ,  $n(A)=200$ ,  $n(B)=300$  and  $n(A \cap B)=100$ , then  $n(A^c \cap B^c)=$

A. 400

B. 600

C. 300

D. 200

**Answer: C**



**Watch Video Solution**

16. In Rule Method the null set is represented by

A.  $\{ \}$

B.  $\phi$

C.  $\{x:x=x\}$

D.  $\{x:x \neq x\}$

**Answer: D**



**Watch Video Solution**



17. If A and B are not disjoint sets then  $n(A \cup B)$  is equal to

A.  $n(A)+n(B)$

B.  $n(A)+n(B)-n(A \cap B)$

C.  $n(A)+n(B)+n(A \cap B)$

D.  $n(A)-n(B)+n(A \cap B)$

**Answer: B**



**Watch Video Solution**

**18.** Let A and B be two sets such that  $n(A)=0.16$ ,  $n(B)=0.14$ ,  $n(A \cup B)=0.25$  then  $n(A \cap B)$  is equal to

A. 0.3

B. 0.5

C. 0.05

D. 0.55

**Answer: C**



**Watch Video Solution**

**19.** In a city 20% of the population travels by car, 50% travels by bus and 10% travels by both car and bus. Then persons travelling by car or bus is

A. 0.8

B. 0.4

C. 0.6

D. 0.7

**Answer: C**



**Watch Video Solution**

20. Given  $n(U)=20$ ,  $n(A)=12$ ,  $n(B)=10$ ,  $n(A \cap B)=4$  where  $U$  is the universal set,  $A$  and  $B$  are subsets of  $U$  then  $n( (A \cup B)^c )=$

A. 17

B. 9

C. 11

D. 2

**Answer: D**

[Watch Video Solution](#)

21. If  $A=\{x:f(x)=0\}$  and  $B=\{x:g(x)=0\}$  then  $A \cap B$  will be

A.  $[f(x)]^2 + [g(x)]^2 = 0$

B.  $\frac{f(x)}{g(x)}$

C.  $\frac{g(x)}{f(x)}$

D. None of these

**Answer: A**

[Watch Video Solution](#)

22. Let  $A$  and  $B$  be two non empty subsets of a set  $X$  such that  $A$  is not a subset of  $B$  then

A.  $A$  is always a subset of the complement of  $B$

B.  $B$  is always a subset of  $A$ .

C.  $A$  and  $B$  are always disjoint.

D.  $A$  and the complement of  $B$  are always non disjoint.

**Answer: D**



**Watch Video Solution**

**23.** If  $A = \{\phi, \{\phi\}\}$ , then the power set of A is

A. A

B.  $\{\phi, \{\phi\}, A\}$

C.  $\{\phi, \{\phi\}, \{\{\phi\}\}, A\}$

D. None of these

**Answer: C**



Watch Video Solution

**24.** If a set  $A$  has  $n$  elements, then the total number of subset of  $A$  or the number of elements in the power set of  $A$

A.  $n$

B.  $n^2$

C.  $2^n$

D.  $2n$

**Answer: C**





Watch Video Solution

**25.** The number of non empty subset of the set  $\{1,2,3,4\}$  is

A. 15

B. 14

C. 16

D. 17

**Answer: A**



26. If  $A = \{x : x \text{ is a multiple of } 3\}$  and  $B = \{x : x \text{ is multiple of } 5\}$  then  $A - B$  is

A.  $\overline{A} \cap B$

B.  $A \cap \overline{B}$

C.  $\overline{A} \cap \overline{B}$

D.  $\overline{A \cap B}$

**Answer: B**



27. Which of the following is empty set?

A.  $\{x:x \text{ is a real number and } x^2-1=0\}$

B.  $\{x:x \text{ is a real number and } x^2+1=0\}$

C.  $\{x:x \text{ is a real number and } x^2-9=0\}$

D.  $\{x:x \text{ is a real number and } x^2=x+2\}$

**Answer: B**



**Watch Video Solution**

28. In Rule Method the null set is represented by

A.  $\{ \}$

B.  $\phi$

C.  $\{x:x=x\}$

D.  $\{x:x \neq x\}$

**Answer: D**



**Watch Video Solution**

**29.** The number of subsets of  $\{1,2,3,\dots,9\}$  containing atleast one odd number is

A. 324

B. 396

C. 496

D. 512

**Answer: C**



**Watch Video Solution**

30. Given  $A=\{x:x \text{ is a root of } x^2-1=0\}$   $B=\{x:x \text{ is a root of } x^2-2x+1=0\}$  then

A.  $A \cap B=A$

B.  $A \cup B=\phi$

C.  $A \cup B=A$

D.  $A \cap B=\phi$

**Answer: C**



**Watch Video Solution**

31. If  $A=\{1,2\}$ ,  $B=\{\{1\},\{2\}\}$ ,  $C=\{\{1\},\{1,2\}\}$ . Then which is true?

A.  $A=B$

B.  $B \subseteq C$

C.  $A \in C$

D.  $A \subseteq C$

**Answer: C**



**Watch Video Solution**

## Questions From Competitive Exams

1. If A and B are not disjoint sets then  $n(A \cup B)$  is equal to

A.  $n(A)+n(B)$

B.  $n(A)+n(B)-n(A \cap B)$

C.  $n(A)+n(B)+n(A \cap B)$

D.  $n(A)n(B)$

**Answer: B**



**Watch Video Solution**



2. In a city 20 percent of the population travels by car, 50 percent travels by bus and 10 percent travels by both car and bus. Then persons travelling by car or bus is

A. 80 percent

B. 40 percent

C. 60 percent

D. 70 percent

**Answer: C**



Watch Video Solution

3. Two finite sets have  $m$  and  $n$  elements. The total number of subsets of the first set is 48 more than the total number of subsets of the second set. Then  $m$  and  $n$  are

A. 7,6

B. 6,3

C. 7,4

D. 3,7

**Answer: C**



**Watch Video Solution**

4. A class has 175 students. The following data shows the number of students opting one or more subjects. Mathematics 100, Physics 70, Chemistry 40, Mathematics and Physics 30, Mathematics and Chemistry 28, Physics and Chemistry 23, Mathematics, Physics and Chemistry 18. How many students have offered Mathematics alone?



Watch Video Solution

5. Given  $n(U)=20$ ,  $n(A)=12$ ,  $n(B)=9$ ,  $n(A \cap B)=4$ , where  $U$  is the universal set,  $A$  and  $B$  are subsets of  $U$ , then  $n[(A \cup B)'] =$

A. 17

B. 9

C. 11

D. 3

**Answer: D**



Watch Video Solution

6. Two finite sets have  $m$  and  $n$  elements. The total number of subsets of the first set is 48 more than the total number of subsets of the second set. Then  $m$  and  $n$  are

A. 7,6

B. 6,3

C. 6,4

D. 7,4

**Answer: C**



**Watch Video Solution**

7. If  $N_a = \{a_n : n \in \mathbb{N}\}$ , then  $N_5 \cap N_7 =$

(Here  $\mathbb{N}$  is the set of natural numbers)

A.  $N_7$

B.  $\mathbb{N}$

C.  $N_{35}$

D.  $N_5$

**Answer: C**



**Watch Video Solution**

8. Two finite sets have  $m$  and  $n$  elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of  $m$  and  $n$  respectively are

A. 7,6

B. 6,3

C. 5,1

D. 7,8

**Answer: B**



**Watch Video Solution**

**9.** The number of elements in the set  $\{(a,b): 2a^2 + 3b^2 = 35, a, b \in \mathbb{Z}\}$ , where  $\mathbb{Z}$  is the set of all integers, is

A. 2



B. 4

C. 8

D. 12

**Answer: C**



**Watch Video Solution**

**10.** Let  $A=\{1,2,3,4\}$ ,  $B=\{2,4,6\}$ . Then the number of sets  $C$  such that  $A \cap B \subseteq C \subseteq A \cup B$  is

A. 6

B. 9

C. 8

D. 10

**Answer: C**



**Watch Video Solution**

**11.** Let  $X$  and  $Y$  be the sets of all positive divisors of 400 and 1000 respectively (including 1 and the number). Then  $n(X \cap Y) =$

A. 4

B. 6

C. 12

D. 10

**Answer: C**



**View Text Solution**

**12.** In a certain town 25% families own a cell phone, 15% families own a scooter and 65% families own neither a cell phone nor a

scooter. If 1500 families own both a cell phone and a scooter, then the total number of families in the town is

A. 10000

B. 20000

C. 30000

D. 40000

**Answer: C**



**Watch Video Solution**

13. Two finite sets  $A$  and  $B$  have  $m$  and  $n$  elements respectively. If the total number of subsets of  $A$  is 112 more than the total number of subsets of  $B$ , then the value of  $m$  is

A. 7

B. 9

C. 10

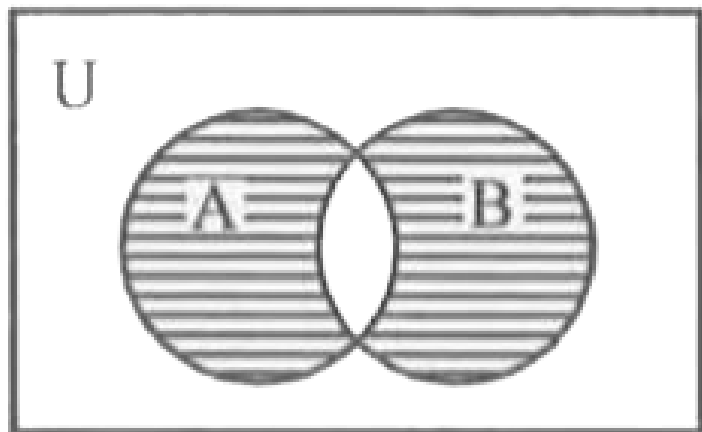
D. 12

**Answer: A**



**Watch Video Solution**

14. The shaded region in the figure represents



A.  $A \cap B$

B.  $A \cup B$

C.  $B - A$

D.  $(A - B) \cup (B - A)$

**Answer: D**



**Watch Video Solution**

**15.** If  $n(A)=8$  and  $n(A \cap B)=2$ , then  $n((A \cap B)' \cap A)$  is equal to

A. 2

B. 4

C. 6

D. 8

**Answer: C**



**Watch Video Solution**

**16.** If the set  $A$  contains 5 elements, then the number of elements in the power set  $P(A)$  is equal to

A. 32

B. 25

C. 16

D. 8



**Answer: A**



**Watch Video Solution**

**17.** If  $n(A)=1000$ ,  $n(B)=500$  and if  $n(A \cap B) \geq 1$  and  $n(A \cup B)=p$ , then

A.  $500 \leq p \leq 1000$

B.  $1001 \leq p \leq 1498$

C.  $1000 \leq p \leq 1498$

D.  $1000 \leq p \leq 1499$

**Answer: D**



**Watch Video Solution**

**18.** If  $n(A)=43$ ,  $n(B)=51$  and  $n(A \cup B)=75$ , then  
 $n((A-B) \cup (B-A))=$

A. 53

B. 45

C. 56

D. 66

**Answer: C**



**Watch Video Solution**

**19.** If A and B are non-empty sets such that  $A \supset B$ , then

A.  $B' - A' = A - B$

B.  $B' - A' = B - A$

C.  $A' - B' = A - B$

D.  $A' \cap B' = B - A$

**Answer: A**



**Watch Video Solution**

**20.** Let  $X=\{1,2,3,\dots,10\}$  and  $A=\{1,2,3,4,5\}$ . Then the number of subsets  $B$  of  $X$  such that  $A-B=\{4\}$  is

A.  $2^5$

B.  $2^4$

C.  $2^5-1$

D. 1

**Answer: A**



**View Text Solution**

**21.** The number of students who take both the subjects mathematics and chemistry is 30. This represents 10% of the enrolment in mathematics and 12% of the enrolment in chemistry. How many students take at least one of these two subjects?

**A. 520**

B. 490

C. 560

D. 480

**Answer: A**



**Watch Video Solution**