CLASS - X

TELANGANA

A GRADE MODEL PAPER 8

MATHEMATICS : PAPER - I

MARCH 2016

Time : 2 hours 45 min.] **Parts - A and B** [Max. Marks : 40

Real Numbers, Sets, Polynomials, Pair of Linear Equations in Two Variables, Quadratic Equations, Progressions, Coordinate Geometry

Instructions :

1. In the time duration of 2 hours 45 minutes, 15 minutes of time is allotted to read and understand the Question paper.
2. Answer the Questions under **Part – A** on a separate answer book.
3. Write the answer to the questions under **Part – B** on the question paper itself and attach it to the answer book of **Part – A**.

Time : 2.15 Hours] **PART - A** [Max. Marks : 35

Note :

1. Answer **all** the questions from the given **three** sections I, II and III of **Part – A**.
2. In section – III, every question has internal choice. Answer **anyone** alternative.

SECTION – I

$7 \times 1 = 7$

Note : (i) Answer **all** the following questions.

(ii) Each question carries **1** Mark.

1. Find the value of $\log_5 125$.
2. If $A = \left\{1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}\right\}$, then write A in Set - builder form.
3. Write an example for a quadratic polynomial that has no zeroes.
4. If $b^2 - 4ac > 0$ in $ax^2 + bx + c = 0$; then what can you say about roots of the equation? $(a \neq 0)$
5. Find the sum of first 200 natural numbers.
6. For what values of m, the pair of equations $3x + my = 10$ and $9x + 12y = 30$ have a unique solution.
7. Find the mid point of the line segment joining the points $(-5, 5)$ and $(5, -5)$.

SECTION – II $6 \times 2 = 12$

Note : (i) Answer **all** the following questions.

(ii) Each question carries **2** Marks.

8. If $x^2 + y^2 = 7xy$; then show that $2 \log (x + y) = \log x + \log y + 2 \log 3$.

9. Length of a rectangle is 5 units more than its breadth. Express its perimeter in polynomial form.

10. Measures of sides of a triangle are in Arithmetic Progression. Its perimeter is 30cm, and the difference between the longest and shortest side is 4cm; then find the measures of the sides.

11. Show that the points A(–3, 3), B(0, 0), C(3, –3) are collinear.

12. Solve the following pair of linear equations by Substitution method.

    $2x - 3y = 19$ and $3x - 2y = 21$

13. If $9x^2 + kx + 1 = 0$ has equal roots, find the value of k.

SECTION – III $4 \times 4 = 16$

Note : (i) Answer **all** the following questions.

(ii) In this section, every question has internal choice.

(iii) Answer **anyone** alternative.

(iv) Each question carries **4** Marks.

14. a) Use Euclid's division lemma to show that the cube of any positive integer is of the form $7m$ or $7m + 1$ or $7m + 6$.

    OR

    b) Prove that $\sqrt{2} - 3\sqrt{5}$ is an irrational number.

15. a) Draw the graph for the polynomial $p(x) = x^2 - 3x + 2$ and find the zeroes from the graph.

    OR

    b) Draw the graph for the following pair of linear equations in two variables and find their solution from the graph.

    $3x - 2y = 2$ and $2x + y = 6$

16. a) Sum of the squares of two consecutive positive even integers is 100; find those numbers by using quadratic equations.

    OR

    b) X is a set of factors of 24 and Y is a set of factors of 36, then find sets $X \cup Y$ and $X \cap Y$ by using Venn diagram and comment on the answer.

17. a) Find the sum of all the three digit numbers, which are divisible by 4.

    OR

    b) Find the coordinates of the points of trisection of the line segment joining the points (–3, 3) and (3, –3).

Time : 30 Mts.] **PART - B** [Max. Marks : 5

Instructions :

(i) Answer **all** the questions.

(ii) Each question carries ½ mark.

(iii) Answers are to be written in question paper only.

(iv) Marks will **not** be awarded in any case of over - writing, rewriting or erased answers.

I. Write the **CAPITAL LETTERS (A,B,C,D)** showing the correct answer for the following questions in the brackets provided against them. **10 × ½ = 5**

1. **Which one of the following is not rational number ?** [ ]

(A) $\log_{10}3$ (B) $5.\overline{23}$ (C) 123.123 (D) $\frac{10}{19}$

2. **L.C.M. of 24, 36 is** [ ]

(A) 24 (B) 36 (C) 72 (D) 864

3. **Which one of the following is the example of finite set ?** [ ]

(A) $\{x/x \in N \text{ and } x^2 = 9\}$.

(B) Set of rational number between 2 and 3.

(C) Set of all multiples of even prime numbers.

(D) Set of all odd prime numbers.

4. **Number of sub-sets of a set ϕ is ....** [ ]

(A) 0 (B) 1 (C) 3 (D) 4

5. **In Geometric Progression formula $t_n = ar^{n-1}$, r denotes ....** [ ]

(A) n^{th} term (B) Numbers of terms (C) Common ratio (D) First term

6. **The co-efficient of x^7 in the polynomial $7x^{17} - 17x^{11} + 27x^5 - 7$ is ....** [ ]

(A) –1 (B) 0 (C) 7 (D) 17

7. **Which one of the following quadratic equations has equal roots ?** [ ]

(A) $x^2 - 5 = 0$ (B) $x^2 - 10x + 25 = 0$ (C) $x^2 + 5x + 6 = 0$ (D) $x^2 - 1$

8. **The value of x which satisfies the equation $3x - (x - 4) = 3x + 1$ is ....**

(A) –3 (B) 0 (C) 3 (D) 10 [ ]

9. **Slope of the line passing through (–1, –1) and (1, 1) is ....** [ ]

(A) –1 (B) 0 (C) 1 (D) Not defined

10. **Which of the following Geometric Progressions has the common ratio as $\sqrt{2}$?**

[ ]

(A) $\sqrt{2}, \sqrt{6}, \sqrt{18}$ (B) $\sqrt{3}, \sqrt{6}, \sqrt{12}$ (C) $\sqrt{5}, \sqrt{15}, \sqrt{45}$ (D) $\sqrt{7}, \sqrt{21}, \sqrt{63}$

SOLUTIONS

PART - A

SECTION – I

1. Find the value of $\log_5 125$.

Sol. We have the rule

if $\text{Log}_a N = x$ then $a^x = N$ let us consider $\text{Log}_5 125 = x$

then $5^x = 125 = 5^3$

$\Rightarrow x = 3$ So $\text{Log}_5 125 = 3$

2. If $A = \left\{1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}\right\}$, then write A in Set - builder form.

Sol. $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}$ are in the form of $\frac{1}{p^2}$ whereas $p < 6$.

So, $A = \{x : x = \frac{1}{p^2}\ p \in N, \text{ and } p < 6\}$

is the set builder form.

3. Write an example for a quadratic polynomial that has no zeroes.

Sol. A quadratic polynomial is in the form of $ax^2 + bx + c$. As this has no zeroes, its discriminant will not be a real number.

So $b^2 - 4ac < 0$

So we can choose certain a, b, c values where $b^2 - 4ac < 0$

For examples $a = 1, b = 4$ and $c = 9$

So $ax^2 + bx + c = 0$

$\Rightarrow x^2 + 4x + 9 = 0$ will not have zeroes.

4. If $b^2 - 4ac > 0$, in $ax^2 + bx + c = 0$; then what can you say about roots of the equation ? $(a \neq 0)$

Sol: The discriminant $b^2 - 4ac > 0$ of the quadratic equation $ax^2 + bx + c = 0$ is positive. Hence its roots are real and unequal.

5. Find the sum of first 200 natural numbers.

Sol. Formula for the sum of first n natural numbers is $\boxed{\Sigma_n = \frac{n(n+1)}{2}}$ Put $n = 200$ in above formula.

We get

$$\Sigma 200 = \frac{200 \times (200+1)}{2} = \frac{\overset{100}{\cancel{200}} \times 201}{\cancel{2}}$$

$$= 20,100$$

6. For what values of m, the pair of equations $3x + my = 10$ and $9x + 12y = 30$ have a unique solution.

Sol. We know that the system of equations

$a_1x + b_1y + c_1 = 0$ and

$a_2x + b_2y + c_2 = 0$.

will have unique solutions.

If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

Here in the given system $a_1 = 3$;

$b_1 = m$ and $a_2 = 9$; $b_2 = 12$

So $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ becomes

$\frac{3}{9} \neq \frac{m}{12} \Rightarrow m \neq \frac{12 \times 3}{9} = 4$

So for $m \neq 4$ the above system will have unique solution i.e., $R - (4)$.

7. **Find the mid point of the line segment joining the points (–5, 5) and (5, –5).**

Sol. Formula for the mid point of line segment formed by (x_1, y_1) and (x_2, y_2) is

$\left[\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right]$ here $x_1 = -5, y_1 = 5$

and $x_2 = 5, y_2 = -5$

$\therefore$ mid point

$$= \left[\frac{-5+5}{2}, \frac{5-5}{2}\right] = \left[\frac{0}{2}, \frac{0}{2}\right] = [0, 0]$$

SECTION – II

8. **If $x^2 + y^2 = 7xy$; then show that $2 \log (x + y) = \log x + \log y + 2 \log 3$.**

Sol. $x^2 + y^2 = 7xy$ (given)

Add 2xy in both sides of above equaion.

$\Rightarrow x^2 + y^2 + 2xy = 7xy + 2xy = 9xy$

So $(x + y)^2 = 9xy$ (Consider logarithm on both sides)

We get $\log (x + y)^2 = \log 9xy$

$\Rightarrow 2\log (x + y) = \log 9 + \log x + \log y$

$= \log x + \log y + \log 3^2$

$= \log x + \log y + 2 \log 3$

$\therefore 2 \log (x + y) = \log x + \log y + 2 \log 3$

Hence proved.

9. **Length of a rectangle is 5 units more than its breadth. Express its perimeter in polynomial form.**

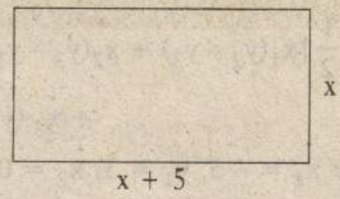
Sol. Let the breadth of rectangle = x m and its length = x + 5 m.

So the perimeter $= 2(l + b)$

$= 2 (x + 5 + x)$

$= 2 (2x + 5)$

$= 4x + 10$ m



4x + 10 is the polynomial which represents the perimeter of above rectangle.

10. **Measures of sides of a triangle are in Arithmetic Progression. Its perimeter is 30cm, and the difference between the longest and shortest side is 4cm; then find the measures of the sides.**

Sol. Let the 3 sides of given triangle

$= a - d, a, a + d$

Then its perimeter

$= a - d + a + a + d = 30$ cm.

$3a = 30 \text{ cm} \Rightarrow a = \frac{30}{3} = 10$ cm.

The larger side = a + d

The shorter side = a – d

The difference between the above two $= (a + d) - (a - d) = 4$ cm.

$\not{a} + d - \not{a} + d = 4$ cm.

$2d = 4 \Rightarrow d = \frac{4}{2} = 2$ cm.

a = 10 cm, d = 2cm

So the sides a – d = 10 – 2 = 8 cm

and a + d = 10 + 2 = 12 cm.

So 8, 10, 12 cm are the sides of the triangle.

11. **Show that the points A(–3, 3), B(0, 0), C(3, –3) are collinear.**

Sol. To show them as collinear the area formed by the triangle should be zero.

Formula for area of triangle

$$\Delta = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3 (y_1 - y_2)|$$

Here $x_1 = -3, y_1 = 3; x_2 = 0, y_2 = 0$ and $x_3 = 3, y_3 = -3$

$$\text{So } \Delta = \frac{1}{2} |-3(3-0) + 0(-3-3) + 3(3-0)|$$

$$= \frac{1}{2} |-3(3) + 0(-6) + 3(3)|$$

$$= \frac{1}{2} |-9 + 0 + 9|$$

$$= \frac{1}{2} |0| = 0 \text{ sq. units}$$

Hence the above three points are collinear.

12. Solve the following pair of linear equations by Substitution method.

$2x - 3y = 19$ and $3x - 2y = 21$

Sol. The given equations are

$$2x - 3y = 19 \quad \text{—— (1)}$$

and $3x - 2y = 21$ —— (2)

From the equation (1)

$2x = 19 + 3y$ and $x = \frac{19 + 3y}{2}$

Now substituting this value of

$x = \frac{19 + 3y}{2}$ in equation (2) we get

$3x - 2y = 21$ becomes

$$\frac{3(19 + 3y)}{2} - 2(y) = 21$$

$$\Rightarrow \frac{3(19 + 3y) - 2(2y)}{2} = 21$$

$$\therefore 57 + 9y - 4y = 21 \times 2 = 42$$

$$9y - 4y = 42 - 57$$

$$5y = -15$$

$$\therefore y = \frac{-15}{5} = -3$$

So $y = -3$ Now put this $y = -3$ value in

$x = \frac{19 + 3y}{2}$ we get

$$x = \frac{19 + 3(-3)}{2}$$

$$x = \frac{19 - 9}{2} = \frac{10}{2} = 5$$

So $x = 5$ and $y = -3$ are the solutions of given equations.

Verification :

$2x - 3y = 19$	$3x - 2y = 21$
$2(5) - 3(-3) = 19$	$3(5) - 2(-3) = 21$
$10 + 9 = 19$	$15 + 6 = 21$
$19 = 19$	$21 = 21$
LHS = RHS	LHS = RHS

13. If $9x^2 + kx + 1 = 0$ has equal roots, find the value of k.

Sol. We know the roots of a quadratic equation are equal if and only if its discriminant is zero.

i.e. for $ax^2 + bx + c = 0$, $b^2 - 4ac = 0$

here $a = 9, b = k$ $c = 1$

then $b^2 - 4ac = 0$ becomes

$$k^2 - 4.9.1 = 0$$

$$\Rightarrow k^2 - 36 = 0$$

$$\therefore k^2 = 36 \text{ and } k = \sqrt{36} = \pm 6$$

So $k = \pm 6$

SECTION - III

14.a) Use Euclid's division lemma to show that the cube of any positive integer is of the form 7m or 7m +1 or 7m + 6.

Sol. From the Euclid's lemma we can consider a positive integer 'a'

a = bq + r (r is the remainder)

Let us now consider a positive integer 'a' and b = 7 then 'a' is in the form of

$a = 7q + r$

(r = either 0, 1, 2, 3, 4, 5 or 6)

If $r = 0$ then $a = 7q$

$r = 1$ then $a = 7q + 1$

$r = 2$ then $a = 7q + 2$

$r = 6$ then $q = 7q + 6$

So 'a' will be in the form of anyone of the above

Then abc of the positive integer a is a^3

So $a = 7q + r$

$\Rightarrow a^3 = (7q + r)^3$

$(\because (a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2)$

$\Rightarrow a^3 = 343q^3 + 49q^2r + 7qr^2 + r^3$

$= 7[49q^3 + 7q^2r + qr^2] + r^3$

$= 7m + r^3$

[where $49q^3 + 7q^2r + qr^2 = m$]

$a^3 = 7m + r^3$

If $r = 0$ then $a^3 = 7m + 0^3 = 7m$

$r = 1$ then $a^3 = 7m + 1^3 = 7m + 1$

$r = 2$ then $a^3 = 7m + 2^3$

$= 7m + 8$

$= 7(m + 1) + 1$

So it is m the form of 7m + 1

If $r = 3$ then $a^3 = 7m + 3^3$

$= 7m + 27$

$= 7m + 21 + 6$

$= 7(m + 3) + 6$

It is in the form of 7m + 6

If $r = 4$ then $a^3 = 7m + 4^3$

$= 7m + 64$

$= 7m + 63 + 1$

$= 7(m + 9) + 1$

$= 7m + 1$ form

if $r = 5$ then $a^3 = 7m + 5^3$

$= 7m + 125$

$= 7m + 119 + 6$

$= 7(m + 17) + 6$

$= 7m + 6$ form

If $r = 6$ then $a^3 = 7m + 6^3$

$= 7m + 216$

$= 7m + 210 + 6$

$= 7(m + 30) + 6$

$= 7m + 6$ form

So, cube of a positive integer will be either in the form of 7m, 7m, + 1 or 7m + 6.

OR

b) Prove that $\sqrt{2} - 3\sqrt{5}$ is an irrational number.

Sol. Consider $\sqrt{2} - 3\sqrt{5}$ is not an irrational one. Then it will be a rational number.

That means it will be in the form of $\frac{p}{q}$ $(q \neq 0)$ (p, q are mutual prime)

$$\therefore \sqrt{2} - 3\sqrt{5} = \frac{p}{q}$$

$$\Rightarrow \sqrt{2} = \frac{p}{q} + 3\sqrt{5}$$

(squaring on both sides)

$$(\sqrt{2})^2 = \left[\frac{p}{q} + 3\sqrt{5}\right]^2$$

$$2 = \frac{p^2}{q^2} + 45 + \frac{2p}{q} \cdot 3\sqrt{5}$$

Then

$$\frac{p}{q}.(6\sqrt{5}) = 2 - 45 - \frac{p^2}{q^2} = -43 - \frac{p^2}{q^2}$$

$$\therefore \frac{p}{q}(6\sqrt{5}) = -\left[43 + \frac{p^2}{q^2}\right]$$

$$\therefore \sqrt{5} = -\left[\frac{43q^2 + p^2}{q^2}\right]\left[\frac{q}{6p}\right] \text{ —— (1)}$$

Since p and q are integers the RHS part of above equation (1) becomes a rational and RHS part $\sqrt{5}$ is an irrational one which is unfair.

So our assumption is wrong.

Then $\sqrt{2} - 3\sqrt{5}$ is an irrational number.

15.a) Draw the graph for the polynomial $p(x) = x^2 - 3x + 2$ and find the zeroes from the graph.

Sol. let $y = p(x) = x^2 - 3x + 2$

If $x = 0$ then $p(0) = 0 - 0 + 2$
$= 2$ So $(0, 2)$

$x = 1$ then $p(1) = 1^2 - 3(1) + 2$
$= 1 - 3 + 2$
$= 0$ So $(1, 0)$

$x = 2$ then $p(2) = 2^2 - 3(2) + 2$
$= 4 - 6 + 2$
$= 0$ So $(2, 0)$

$x = 3$ then $p(3) = 3^2 - 3(3) + 2$
$= 9 - 9 + 2$
$= 2$ So $(3, 2)$

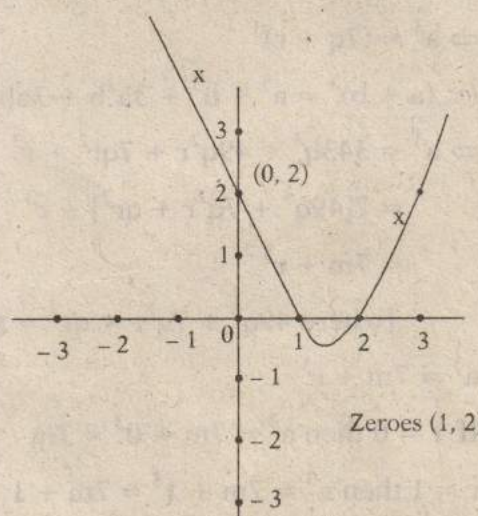
and if $x = -1$ then $p(-1)$
$= (-1)^2 - 3(-1) + 2$
$= 1 + 3 + 2$
$= 6$ So $(-1, 6)$

$x = -2$ then $p(-2) = (-2)^2 - 3(-2) + 2$
$= 4 + 6 + 2 = 12$ So $(-2, 12)$

that means the graph of the polynomial

$p(x) = x^2 - 3x + 2$ passes through the points.

(0, 2), (1, 0) (2, 0) (3, 2) (–1, 6) and (–2, 12)



So 1 and 2 are zeros of the given polynomial.

OR

b) Draw the graph for the following pair of linear equations in two variables and find their solution from the graph.

$3x - 2y = 2$ and $2x + y = 6$

Sol. First we have to recognise the points through which the line $3x - 2y = 2$ passes then after $2x + y = 6$ pass.

Let us find the points $3x - 2y = 2$

So $y = \dfrac{3x-2}{2}$ .... (1)

Put $x = 0$ in above equation

$\therefore y = \dfrac{3(0)-2}{2} = \dfrac{0-2}{2} = -1$ So $(0, -1)$

Now $x = 1$ then

$y = \dfrac{3(1)-2}{2} = \dfrac{3-2}{2} = \dfrac{1}{2}$ So $\left(1, \dfrac{1}{2}\right)$

Now $x = 2$ then

$y = \dfrac{3(2)-2}{2} = \dfrac{6-2}{2} = \dfrac{4}{2} = 2$ So $(2, 2)$

that means the line $3x - 2y = 2$ passes through the points $(0, -1)$, $(1, \frac{1}{2})$ and $(2, 2)$.

Similarly

$2x + y = 6$

$\Rightarrow y = 6 - 2x$ .... (2)

Put $x = 0$ in the above equation (2) we get $y = 6 - 2(0) = 6 - 0 = 6$

So $(0, 6)$

and $x = 1 \Rightarrow y = 6 - 2(1) = 6 - 2 = 4$

So $(1, 4)$

and $x = 2 \Rightarrow y = 6 - 2(2) = 6 - 4 = 2$

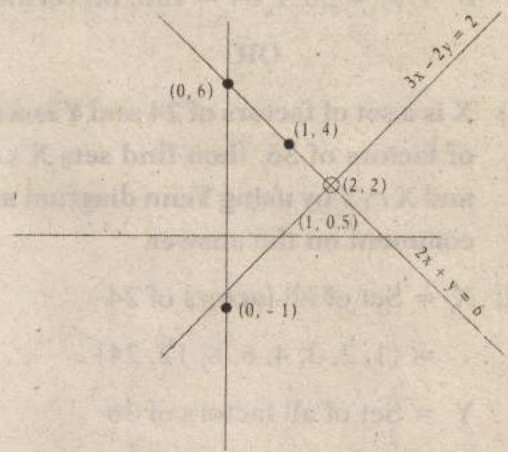
So $(2, 2)$

So the line $2x + y = 6$ passes through the points $(0, 6)$ $(1, 4)$ and $(2, 2)$

Here we observe $(2, 2)$ is the common point.

That means they intersert at (2,2)

So $x = 2$ and $y = 2$ will be the solution of above the equations.



16.a) Sum of the squares of two consecutive positive even integers is 100; find those numbers by using quadratic equations.

Sol. Let the first positive even number $= x$ say

Then its square $= x^2$

The consecutive even number $= x + 2$

Then square of it $= (x + 2)^2$

Sum of squares of above two

$= (x)^2 + (x + 2)^2 = 100$

$\therefore x^2 + x^2 + 4x + 4 = 100$

$2x^2 + 4x + 4 - 100 = 0$

$\Rightarrow 2x^2 + 4x - 96 = 0$

$\therefore x^2 + 2x - 48 = 0$ (-48 → 8, (-6))

$\Rightarrow x^2 + 8x - 6x - 48 = 0$

$x(x + 8) - 6(x + 8) = 0$

$\therefore (x - 6)(x + 8) = 0$

$\Rightarrow x - 6 = 0$ or $x + 8 = 0$

$\Rightarrow x = 6$ or $x = -8$

We consider $x = 6$ only because it is a positive even

$\Rightarrow x + 2 = 6 + 2 = 8$

Then the given numbers are 6 and 8

Verification :

$6^2 + 8^2 = 36 + 64 = 100$. So verified.

OR

b) X is a set of factors of 24 and Y is a set of factors of 36, then find sets $X \cup Y$ and $X \cap Y$ by using Venn diagram and comment on the answer.

Sol. X = Set of all factors of 24

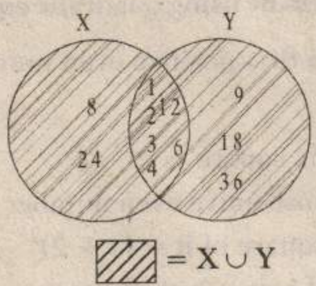
$= \{1, 2, 3, 4, 6, 8, 12, 24\}$

Y = Set of all factors of 36

$= \{1, 2, 3, 4, 6, 9, 12, 18, 36\}$

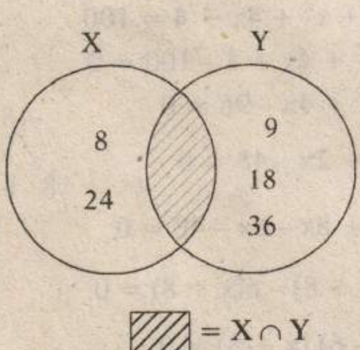
Venn diagram of $X \cup Y$

i)



$\therefore X \cup Y = \{1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36\}$

ii)



$\therefore X \cap Y = \{1, 2,,3, 4, 6, 12\}$

$\therefore$ It is clear $X \cup Y \neq X \cap Y$

17.a) Find the sum of all the three digit numbers, which are divisible by 4.

Sol. The 3 digit numbers are 100, 101, 102, ... 999 among them the number divisible by 4 are 100, 104, 108, ... 996 which is an A.P the first term $a = 100$

Common difference $= a_2 - a_1$

$= 104 - 100 = 4$

Let the number of terms = n

The nth term $a_n = 996$

$$\boxed{a_n = a + (n-1)d}$$

$$996 = 100 + (n-1)4$$

$$\frac{996-100}{4} = n - 1$$

$$\frac{896}{4} = n - 1 = 224$$

$$\Rightarrow n = 224 + 1 = 225$$

Now formula for sum of 'n' terms in AP is

$$S_n = \frac{n}{2}[a + l]$$

$$= \frac{225}{2}[100 + 996]$$

$$= \frac{225 \times 1096}{2} = \boxed{1,23,300}$$

OR

b) Find the coordinates of the points of trisection of the line segment joining the points (–3, 3) and (3, –3).

Sol. The points which divide the line segment by 1 : 2 and 2 : 1 ratio (internally) are called trisection points.

Formula for the points of trisection of the line segment joined by (x_1, y_1) and (x_2, y_2) are

$$= \left[\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n}\right]$$

Where m = 2 and n = 1.

Here $x_1 = -3$, $y_1 = 3$ and $x_2 = 3$,

$y_2 = -3$ then the point in the ratio 2 : 1 is

$$\left(\frac{2(3)+1(-3)}{2+1}, \frac{2(-3)+1(3)}{2+1}\right)$$

$$= \left(\frac{6-3}{3}, \frac{-6+3}{3}\right) = \left(\frac{3}{3}, \frac{-3}{3}\right) = (1, -1)$$

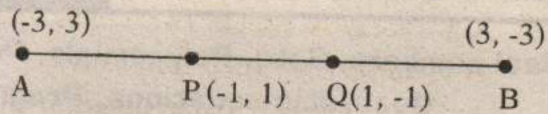
So (1, −1) is one trisection point. The point which is at 1 : 2 ratio is another trisection point.

So $m = 1$, $n = 2$, $x_1 = -3$, $y_1 = 3$, $x_2 = 3$ and $y_2 = -3$

$$\text{then } \left[\frac{1(3)+2(-3)}{1+2}, \frac{1(-3)+2(3)}{1+2}\right]$$

$$= \left[\frac{3-6}{3}, \frac{-3+6}{3}\right] = \left[\frac{-3}{3}, \frac{3}{3}\right]$$

= (−1, 1) is another trisection point.



P, Q are trisection points.

PART - B

1. A 2. C 3. A 4. B 5. C 6. B 7. B 8. C 9. C 10. B

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