BUDHA DAL PUBLIC SCHOOL PATIALA

FIRST TERM EXAMINATION (12 September 2023)

Class – IX

Paper-Mathematics (Set-B)

Time: 3hrs. M.M. 80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section F has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

Section-A

1. Which of the following is an irrational number

   a) 0.13 b) $0.13\overline{15}$ c) $0.\overline{1315}$ d) 0.301323100523.....

2. The decimal expansion of a rational number is

   a) Terminating or non terminating non repeating

   b) Terminating or non terminating repeating

   c) Terminating and repeating

   d) None of these

3. The rationalising factor of $\frac{1}{\sqrt{7}-2}$ is

   a) $\sqrt{7}-2$ b) $\sqrt{7}+2$ c) $7-\sqrt{2}$ d) $7+\sqrt{2}$

4. $2\sqrt{3}+\sqrt{3}$ is equal to

   a) $2\sqrt{6}$ b) 6 c) $3\sqrt{3}$ d) $4\sqrt{6}$

5. Which of the following expressions is a linear polynomial

   a) $3x$ b) $5x^2+6$ c) $2x^3+4x+7$ d) xyz

6. If $p(x)=6x$ then zero of $p(x)$ is

   a) 0 b) 1 c) k d) $-k$

7. If $(x+1)$ is a factor of $2x^2+kx$ then value of k is

   a) -3 b) 4 c) 2 d) -2

8. If $p(x)=7x^5-5x^3+6$ then degree of $p(x)$ is

   a) 0 b) 3 c) 5 d) 1

9. Point $(-10, 0)$ lies

a) on negative direction of x – axis b) in third quadrant

c) on negative direction of y-axis d) in fourth quadrant

10. Which of the following points lie in IVth quadrant

a) $(-2, 0)$ b) $(-3, 2)$ c) $(4, -7)$ d) $(-3, -5)$

11. Which of the following point do not lie on x – axis

P (0, 3), Q (1, 0), R (0, – 1), S (– 5, 0), T (0, 2)

a) P and R only b) Q and S only c) P, R and T d) Q, S and T

12. The equation of y – axis is

a) $x = 0$ b) $y = 0$ c) $x = a$ d) $y = a$

13. If $(4, 19)$ is a solution of equation $y = ax + 3$ then a is

a) 3 b) 4 c) 5 d) 6

14. $x = 2$, $y = 1$ is a solution of linear equation

a) $x + 2y = 0$ b) $x + 2y = 4$ c) $2x + y = 0$ d) $2x + y = 5$

15. Two straight lines AB and CD cut each other at O. If $\angle BOD = 63^0$ *then* $\angle BOC =$

a) 63^0 b) 117^0 c) 17^0 d) 153^0

16. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ration 2 : 3 then measure of larger angle is

a) 54^0 b) 120^0 c) 108^0 d) 130^0

17. If $\Delta ABC \cong \Delta LKM$ then side of ΔLKM equal to side AC of ΔABC is

a) $\angle K$ b) $\angle M$ c) $\angle M$ d) None of these

18. If $\Delta PQR \cong \Delta EFD$ then $\angle$E =

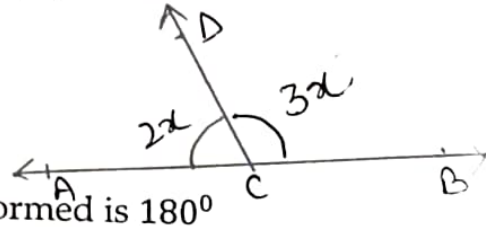
a) $\angle P$ b) $\angle Q$ c) $\angle R$ d) None of these

Assertion – Reason (for question 19 & 20)

Read the given statement choose the correct option:

a) Both Assertion and Reason are true and reason is correct explanation of assertion.
b) Both Assertion and Reason are true but reason is not correct explanation of assertion.
c) Assertion is true but Reason is false.
d) Assertion is false but reason is true.

19. Assertion : In given figure ACB is a straight line then $\angle ACD = 72^0$



Reason : If a ray stands on a line then sum of two adjacent angles formed is 180^0

20. Assertion : If $\Delta ABC \cong \Delta$ then $BC = QR$

Reason : Corresponding parts of two congruent triangles are equal.

Section - B

21. Express : $0.1\overline{34}$ in $\frac{p}{q}$ form

22. Check whether -2 and 2 are zeroes of the polynomial $x - 2$

23. Write True/False. Give reason also.

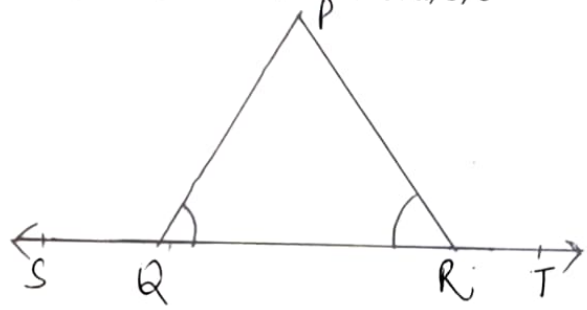
a) The co-ordinates of a point whose ordinate is $-\frac{1}{2}$ and abscissa is 1 are $\left(\frac{-1}{2}, 1\right)$

b) $(-1,7)$ lie in II quadrant

24. Write equation $4 = 5x - 3y$ in $ax + by + c = 0$ form and find values of a, b, c

25. In given figure if $\angle PQR = \angle PRQ$

then prove that $\angle PQS = \angle PRT$



Section - C

26. Represent $\sqrt{9.1}$ on the number line.

27. Expand : a) $(4a - 2b - 3c)^2$ b) $(3a + 4b)^3$

28. Find co-ordinates of point

a) whose abscissa is -10 and which lies on X-axis?

b) whose ordinate is 6 and which lies on y-axis.

c) which lies on X and Y axes both?

29. Check whether $x = 2, y = 1$ is a solution of following equations or not

a) $2x - 3y = 1$ b) $5x - 3y + 7 = 0$

30. Prove that if two lines intersect each other then vertically opposite angles are equal.

31. AD is an altitude of an isosceles triangle

ABC in which $= AC$. Show that

i) AD bisects BC ii) AD bisects $\angle A$

Section – D

32. Find a and b if $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} = a + b\sqrt{6}$

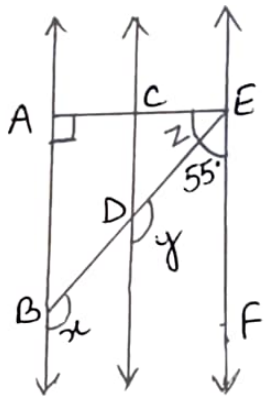
33. Verify that

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$$

34. a) In given figure $AB \parallel CD$, $EF \parallel CD$

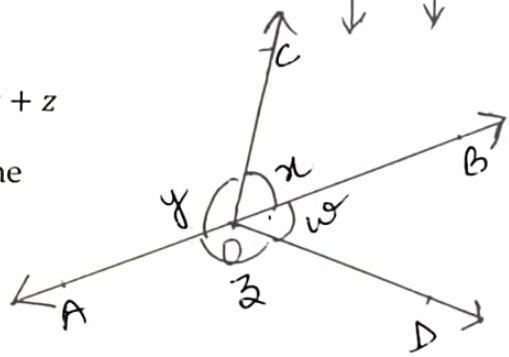
also $EA \perp AB$. If $\angle BEF = 55^0$

then find x, y, z

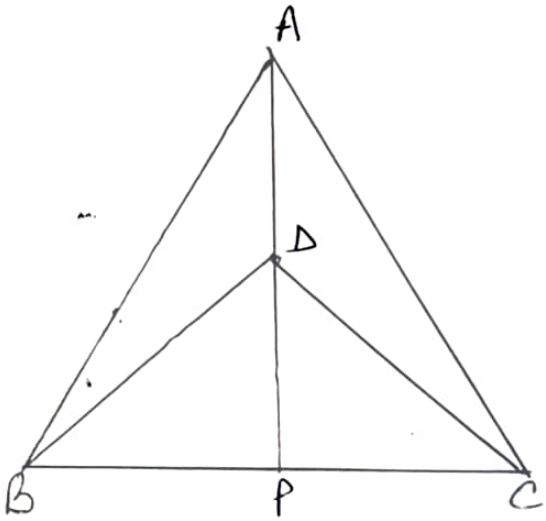


b) In given figure if $x + y = w + z$

then prove that AOB is a line



35. ΔABC and ΔDBC are two isosceles triangles on same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P show that



i) $\Delta ABD \cong \Delta ACD$

ii) $\Delta ABP \cong \Delta ACP$

iii) AP bisects $\angle A$ as well as $\angle D$

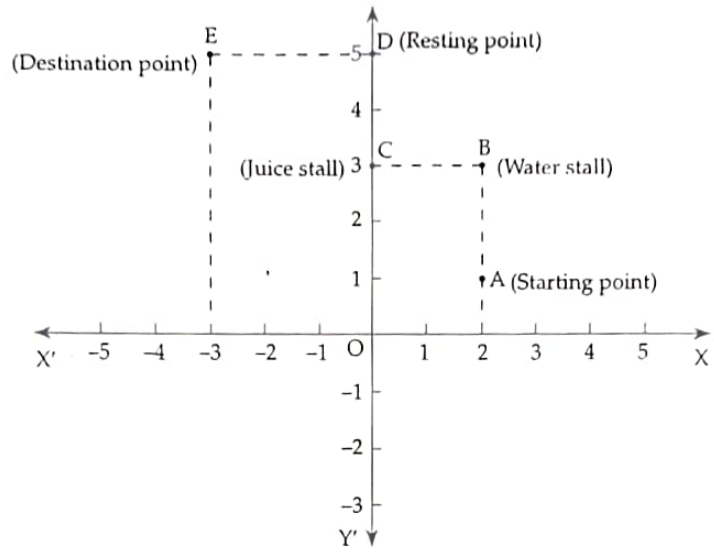
iv) AP is perpendicular bisector of BC

SECTION - E

Q 36

CASE-STUDY 1

To keep himself fit Pankaj used to walk 5 km daily. On one particular day, Pankaj participates in a Marathon. The organisers used a coordinate plane to mark the course of the Marathon. The plan for the Marathon is as follows:



The starting point is A. At B, there is a water stall to keep the participants hydrated. There is a juice stall at point C to keep them energetic. At D, there is a rest point for those who want to take rest in between. E is the final destination point. One unit on the plane represents 1 km.

Based on the above situation, answer the following questions:

(*i*) *Write the coordinates of the starting point A.*

(*ii*) *What is the abscissa of the point where the juice stall has been put?*

(*iii*) *Find the total distance covered by each participant to reach the destination point from the starting point.*

Q 37

CASE-STUDY 2

Put the numbers in the bin:

It is a type of online game that challenges the students to think fast. They will be bombarded with numbers and they have to sort them into rational and irrational buckets.

Two friends Aditya and Arpit played this game. They got the following list of numbers:

$\sqrt{2}$, π, $\frac{1}{2}$, 0.317, 5.3232..., 0.4127126125...

Based on the above information, fill in the blanks in the following questions:

(*i*) Aditya placed π in the rational number bucket. He loses point for it. π is an irrational number because it has .....

(terminating decimal expansion/non-terminating repeating decimal expansion/non-terminating non-repeating decimal expansion).

(*ii*) 0.4127126125... is ..... (a rational number/an irrational number)

(*iii*) In the next level of the game, the player will get two numbers and he has to add or multiply the two numbers and then put the number into the appropriate bucket according to the result.

Arpit gets two irrational numbers and he has to add these numbers. Which of the following statement is true for irrational numbers?

(*a*) Sum of two irrational numbers is always irrational.

(*b*) Sum of two irrational numbers is always rational.

(*c*) Sum of two irrational numbers may be rational or irrational.

Q38. **CASE-STUDY 3**

Any equation of the form $ax + by + c = 0$, where a, b and c are real numbers and a, b are not both zero, is known as a linear equation in two variables.

One day Ram and Ankur go to a stationary shop to purchase some stationary. The shopkeeper tells them that the cost of a notebook is 3 times of the cost of a pen.

Using the information given above, answer the following questions:

(i) *If the cost of a notebook is ₹x and that of a pen is ₹y, then write the linear equation in two variables to represent the given statement.*

(ii) *If the cost of 1 notebook is ₹15, then find the cost of 1 pen.*

(iii) *Find two solutions of the linear equation $x - 3y = 0$.*

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FIRST TERM EXAMINATION (12 September 2023)

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5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

Section-A

1. Every rational number is

   a) A natural number b) An integer c) A real number d) A whole number

2. Which of the following is an irrational number

   a) 0.14 b) $0.14\overline{16}$ c) $0.\overline{1416}$ d) 0.4014001400014……

3. $\sqrt{10} \times \sqrt{15}$ is equal to

   a) $6\sqrt{5}$ b) $5\sqrt{6}$ c) $\sqrt{25}$ d) $10\sqrt{5}$

4. The rationalizing factor of $\frac{1}{5+2\sqrt{6}}$ is

   a) $\sqrt{5}+2\sqrt{6}$ b) $-\sqrt{5}+2\sqrt{6}$ c) $5-2\sqrt{6}$ d) $-5-2\sqrt{6}$

5. Zero of the zero polynomial is

   a) 0 only b) 1 only c) any real number d) not defined

6. $\sqrt{2}$ is a polynomial of degree

   a) 2 b) 0 c) 1 d) $\frac{1}{2}$

7. If $(x+1)$ is a factor of $2x^2+kx$ then value of k is

   a) -3 b) 4 c) 2 d) -2

8. Which of the following expression is a trinomial

   a) $7x^3+2x$ b) $2x^2+3x-x^5$ c) $2x^3+4x^2-5x+1$ d) xyz

9. Point $(-3,5)$ lies in

   a) first quadrant b) second quadrant c) third quadrant d) four quadrant

10. Which of the following lies on y – axis ?

a) $(0,-7)$ b) $(-7,0)$ c) $(2.7,0)$ d) $(-1,3)$

11. The point which lies on y – axis at a distance of 5 units in the negative direction of y – axis is

a) (0, 5) b) (5, 0) c) (0, – 5) d) (– 5, 0)

12. The linear equation $2x - 5y = 7$ has

a) a unique solution b) two solutions c) infinitely many solutions d) no solution

13. $x = 5, y = 2$ is a solution of linear equation

a) $x + 2y = 7$ b) $5x + 2y = 7$ c) $x + y = 7$ d) $5x + y = 7$

14. If a point is lying on line $y = x$ is of the form

a) (9, 9) b) (0, 9) c) (9, 0) d) (a, – 9)

15. Equation of x – axis is

a) $x = 0$ b) $x = a$ c) $y = 0$ d) $y = a$

16. If sum of two adjacent angles is 100^0 and one of them is 35^0 then the other is

a) 70^0 b) 65^0 c) 135^0 d) 145^0

17. If a ray stands on a line then sum of two adjacent angles so formed is

a) 90^0 b) 0^0 c) 180^0 d) 360^0

18. Which of the following is not criterion for congruency of triangles.

a) SAS b) ASA c) SSA d) SSS

Assertion – Reason (for question 19 & 20)

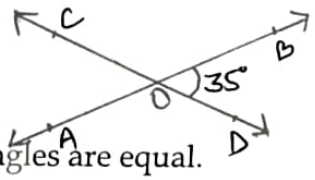
Read the given statement choose the correct option:

a) Both Assertion and Reason are true and reason is correct explanation of assertion.
b) Both Assertion and Reason are true but reason is not correct explanation of assertion.
c) Assertion is true but Reason is false.
d) Assertion is false but reason is true.

19. Assertion : Given two triangles ABC and PQR such that AB = PQ, BC = QR and $\angle B = \angle Q$ then $\Delta ABC \cong \Delta PQR$

Reason : Two triangles are congruent if two sides and the included angle of a triangle are equal to two sides and included angle of other triangle.

20. Assertion : In the adjoining figure two lines AB and CD intersect at O such that $\angle BOD = 35^0$ then $\angle AOD = 145^0$



Reason : If two lines intersect each other then vertically opposite angles are equal.

Section – B

21. Simplify $\sqrt{45} - 3\sqrt{20} + 4\sqrt{5}$

22. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$

23. Write True/False. Give reason also.

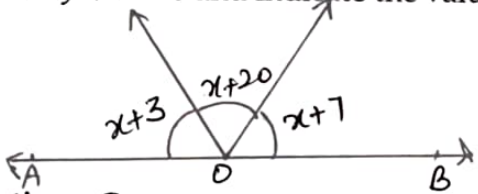
    a) Point (3, 0) lies in the first quadrant

    b) Points (1, – 1) and (– 1, 1) lie in same quadrant.

24. Write the linear equations in the form $ax + by + c = 0$ and indicate the values of a, b and c.

    $2x + 3y = 4.55$

25. If AOB is straight line find x



Section – C

26. Locate $\sqrt{5}$ on the number line.

27. Evaluate (using suitable identity)

    a) 105×106 b) 104×96

28. Find co-ordinates of point

    a) which lies on X and Y axes both ?

    b) Whose ordinate is – 4 and which lies on y – axis ?

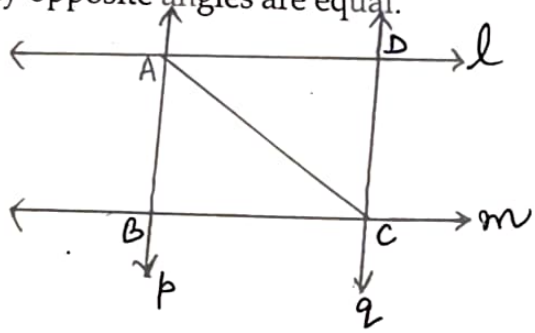
    c) Whose abscissa is 5 and which lies on x – axis ?

29. Check which are the solutions of the equation $x - 2y = 4$ and which are not

    a) (0, 2) b) (2, 0) c) (4, 0)

30. Prove that if two lines intersect each other then vertically opposite angles are equal.

31. l *and* m are two parallel lines intersected by another pair of parallel lines p *and* q . Show that $\Delta ABC \cong \Delta CDA$



Section – D

32. Find a and b if $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} = a + b\sqrt{6}$

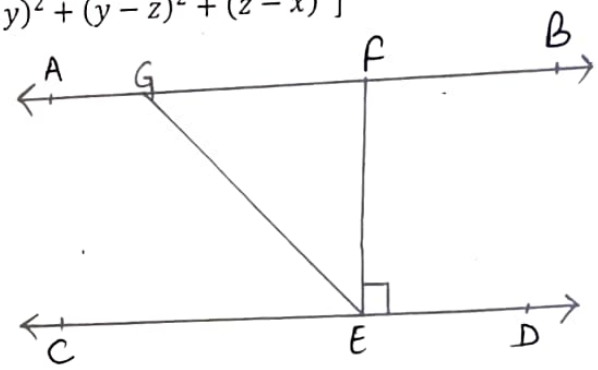
33. Verify that

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x+y+z)[(x-y)^2 + (y-z)^2 + (z-x)^2]$$

34. a) In given figure $AB \parallel CD$, $EF \perp CD$

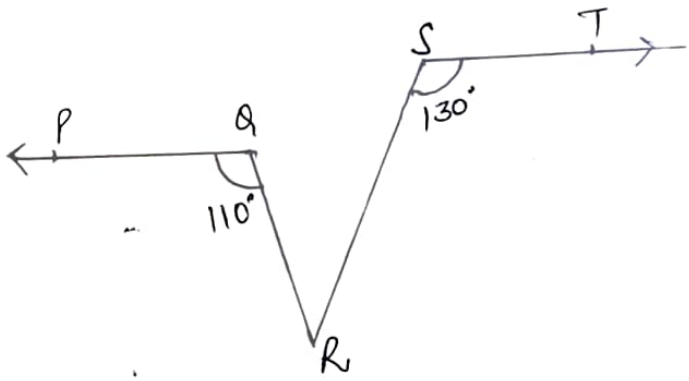
$\angle GED = 126^0$ find

(i) $\angle AGE$ (ii) $\angle GEF$ (iii) $\angle FGE$



b) If $PQ \parallel ST, \angle PQR = 110^0, \angle RST = 130^0$

find $\angle QRS$



35. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to point D such that DM = CM.

Point D is joined to point B

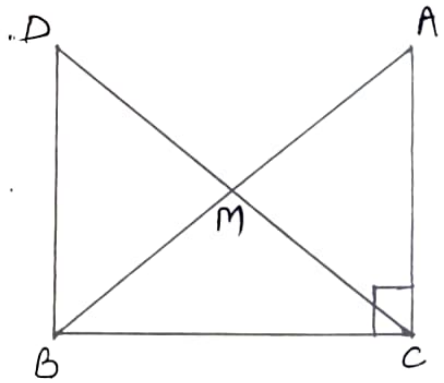
Show that

i) $\Delta AMC \cong \Delta BMD$

ii) $\angle DBC$ is a right angle

iii) $\Delta DBC \cong \Delta ACB$

iv) $CM = \frac{1}{2}AB$



Q36

Section – E

CASE-STUDY 1

In a school, one day the Maths teacher told the students of class IX about the number systems. She drew a number line and explained them that the number line represents various types of numbers on it.

Rational numbers can be represented on the number line. A number is called a rational number if it can be written in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

Based on the above information, answer the following questions:

(*i*) Find a rational number between 2 and 3.

(*ii*) Find an irrational number between $\sqrt{3}$ and $\sqrt{5}$.

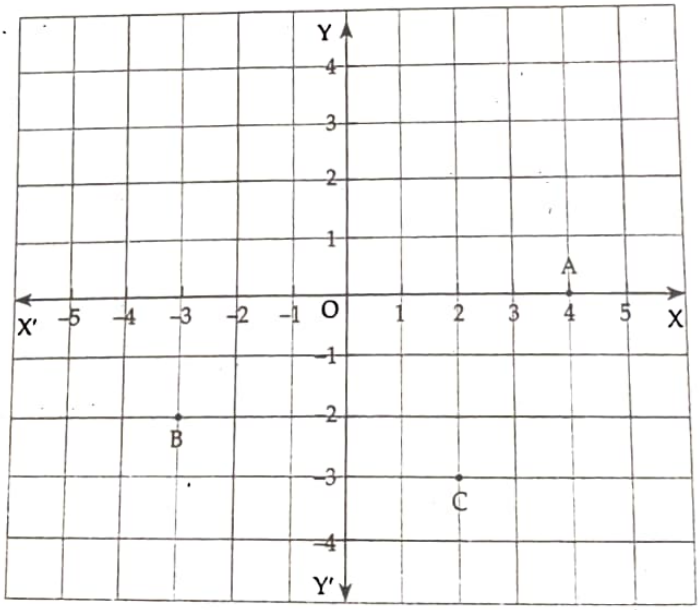
(*iii*) Express $1.\overline{3}$ in the form $\frac{p}{q}$, where p and q are integers, $q \neq 0$.

Q37

CASE-STUDY 2

Students of class IX are on visit to Sansad Bhavan. It was an educational excursion. All the subject teachers assigned different activities to the students related to their subjects. Mathematics teacher asked the students to observe the positions of some of the members of the Parliament.

The chairs in the Parliament are arranged in rows and columns.



Teacher fixed a point in between the house and asked the students to consider it as origin.

Based on the given situation, answer the following questions:

Prime Minister's seat is fixed at a position such that its row number is 4th to the top of origin and column number is 5th to the left of origin.

(i) The position of the Prime Minister is in which quadrant?

(ii) Write the coordinates of the position of Prime Minister's seat.

(iii) If the leader of opposition is sitting at the point A in the above figure, then what is the ordinate of point A?

38.

CASE-STUDY 3

Any equation of the form $ax + by + c = 0$, where a, b and c are real numbers and a, b are not both zero, is known as a linear equation in two variables.

One day Ram and Ankur go to a stationary shop to purchase some stationary. The shopkeeper tells them that the cost of a notebook is 3 times of the cost of a pen.

Using the information given above, answer the following questions:

(i) If the cost of a notebook is ₹x and that of a pen is ₹y, then write the linear equation in two variables to represent the given statement.

(ii) If the cost of 1 notebook is ₹15, then find the cost of 1 pen.

(iii) Find two solutions of the linear equation $x - 3y = 0$.