

**Class IX Session 2024-25**  
**Subject - Mathematics**  
**Sample Question Paper - 5**

**Time Allowed: 3 hours**

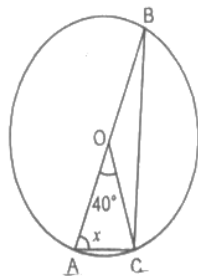
**Maximum Marks: 80**

### General Instructions:

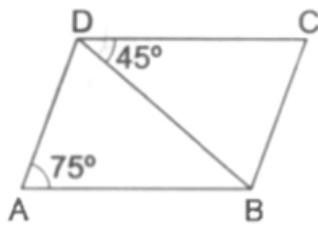
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

## Section A

1. The point which lies on y-axis at a distance of 6 units in the positive direction of y-axis is [1]  
a) (-6, 0) b) (0, -6)  
c) (6, 0) d) (0, 6)
2. The perimeter of an equilateral triangle is 60 m. The area is [1]  
a)  $10\sqrt{3} \text{ m}^2$  b)  $20\sqrt{3} \text{ m}^2$   
c)  $15\sqrt{3} \text{ m}^2$  d)  $100 \sqrt{3} \text{ m}^2$
3. In a figure, O is the centre of the circle with AB as diameter. If  $\angle AOC = 40^\circ$ , the value of x is equal to [1]



- a)  $80^\circ$   
c)  $70^\circ$
- b)  $50^\circ$   
d)  $60^\circ$
4. In the given figure, ABCD is a parallelogram in which  $\angle BDC = 45^\circ$  and  $\angle BAD = 75^\circ$ . Then,  $\angle CBD = ?$  [1]

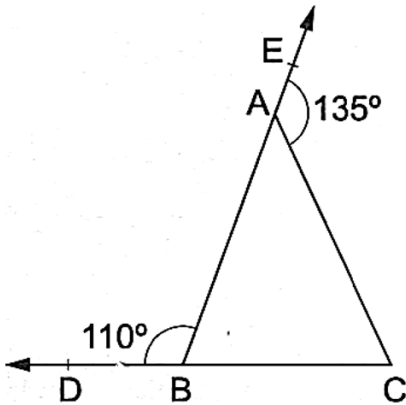


- a)  $60^\circ$   
c)  $75^\circ$
- b)  $45^\circ$   
d)  $55^\circ$

5. The product  $\sqrt[3]{2} \cdot \sqrt[4]{2} \cdot \sqrt[12]{32}$  is equal to **[1]**

- a)  $\sqrt[12]{2}$   
c)  $\sqrt{2}$
- b) 2  
d)  $\sqrt[12]{32}$

6. In the given figure, the sides CB and BA of  $\triangle ABC$  have been produced to D and E respectively such that  $\angle ABD = 110^\circ$  and  $\angle CAE = 135^\circ$ . Then,  $\angle ACB = ?$  **[1]**



- a)  $35^\circ$   
c)  $65^\circ$
- b)  $45^\circ$   
d)  $55^\circ$

7. If  $x = 3$  and  $y = -2$  satisfies  $5x - y = k$ , then the value of  $k$  is **[1]**

- a) 3                                  b) 17  
c) 12                                 d) -2

8. The degree of the zero polynomial is [1]

- a) 0                                      b) any natural number  
c) 1                                        d) not defined

9. The decimal form of  $\frac{2}{11}$  is **[1]**

- a) 0.018                      b) 0.18  
c)  $0.\overline{18}$                         d)  $0.0\overline{18}$

10. If one angle of a parallelogram is  $24^\circ$  less than twice the smallest angle, then the measure of the largest angle of the parallelogram is **[1]**

- a)  $112^\circ$   
c)  $176^\circ$
- b)  $68^\circ$   
d)  $102^\circ$

11.  $9^3 + (-3)^3 - 6^3 = ?$  **[1]**

a) 540

b) 486

c) 270

d) 432

12. The equation  $x - 2 = 0$  on number line is represented by [1]

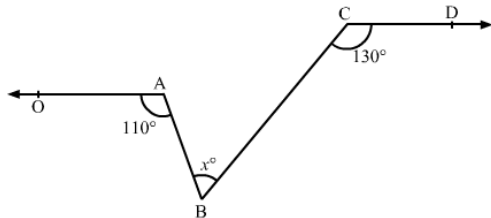
a) infinitely many lines

b) two lines

c) a point

d) a line

13. In the given figure,  $\angle OAB = 110^\circ$  and  $\angle BCD = 130^\circ$  then  $\angle ABC$  is equal to [1]



a)  $50^\circ$

b)  $60^\circ$

c)  $40^\circ$

d)  $70^\circ$

14. If  $\frac{5-\sqrt{3}}{2+\sqrt{3}} = x + y\sqrt{3}$ , then [1]

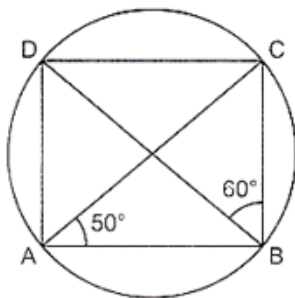
a)  $x = -13, y = -7$

b)  $x = 13, y = -7$

c)  $x = -13, y = 7$

d)  $x = 13, y = 7$

15. In Fig. ABCD is a cyclic quadrilateral. If  $\angle BAC = 50^\circ$  and  $\angle DBC = 60^\circ$  then find  $\angle BCD$ . [1]



a)  $50^\circ$

b)  $60^\circ$

c)  $70^\circ$

d)  $55^\circ$

16. Which of the following points lies on the line  $y = 2x + 3$ ? [1]

a) (2,8)

b) (5,15)

c) (3,9)

d) (4,12)

17. How many lines pass through two points? [1]

a) many

b) three

c) two

d) only one

18. Which one of the following is a polynomial? [1]

a)  $\frac{x-1}{x+1}$

b)  $\sqrt{2x} - 1$

c)  $x^2 + \frac{3x^2}{\sqrt{x}}$

d)  $\frac{x^2}{2} - \frac{2}{x^2}$

19. **Assertion (A):** In  $\triangle ABC$ , median AD is produced to X such that  $AD = DX$ . Then ABXC is a parallelogram. [1]

**Reason (R):** Diagonals AX and BC bisect each other at right angles.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Three rational numbers between  $\frac{2}{5}$  and  $\frac{3}{5}$  are  $\frac{9}{20}$ ,  $\frac{10}{20}$  and  $\frac{11}{20}$  [1]

**Reason (B):** A rational number between two rational numbers p and q is  $\frac{1}{2}(p + q)$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

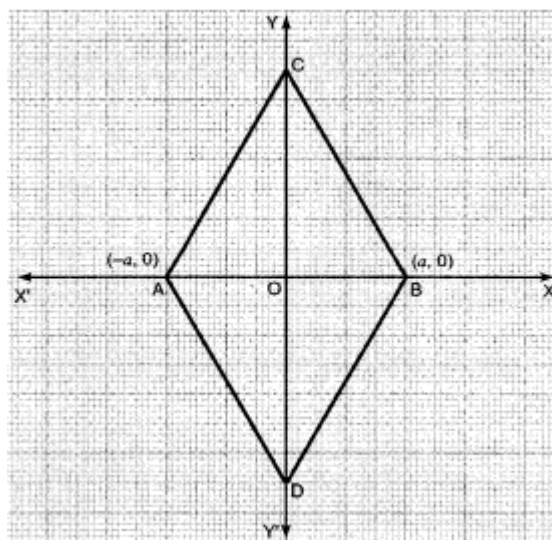
d) A is false but R is true.

### Section B

21. If a point O lies between two points P and R such that  $PO = OR$  then prove that  $PO = \frac{1}{2}PR$ . [2]

22. Why is Axiom 5, in the list of Euclid's axioms, considered a **universal truth**? [2]

23. In Fig., if ABC and ABD are equilateral triangles then find the coordinates of C and D. [2]



24. Prove that:  $\frac{a+b+c}{a^{-1}b^{-1}+b^{-1}c^{-1}+c^{-1}a^{-1}} = abc$  [2]

OR

Express  $0.3\overline{57}$  in the form  $\frac{p}{q}$ , where p and q are integers and  $q \neq 0$ .

25. If the volume of a right circular cone of height 9 cm is  $48\pi \text{ cm}^3$ , find the diameter of its base. [2]

OR

A team of 10 interns and 1 professor from zoological department visited a forest, where they set up a conical tent for their accommodation. There they perform activities like planting saplings, yoga, cleaning lakes, testing the water for contaminants and pollutant levels and desilt the lake bed and also using the silt to strengthen bunds.

Find the radius and height of the tent if the base area of tent is  $154 \text{ cm}^2$  and curved surface area of the tent is  $396 \text{ cm}^2$ .

### Section C

26. Represent  $\sqrt{4.5}$  on the number line. [3]

27. Draw a histogram for the daily earnings of 30 drug stores in the following table: [3]

Daily earnings (in ₹):	450 - 500	500 - 550	550 - 600	600 - 650	650 - 700
Number of Stores:	16	10	7	3	1

28. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC [3]

intersects AC at D. Show that

i. D is the mid-point of AC

ii.  $MD \perp AC$

iii.  $CM = MA = \frac{1}{2} AB$

29. Write linear equation  $3x + 2y = 18$  in the form of  $ax + by + c = 0$ . Also write the values of a, b and c. Are (4, 3) and (1, 2) solution of this equation? [3]

30. Following are the marks of a group of 92 students in a test of reading ability : [3]

Marks	50-52	47-49	44-46	41-43	38-40	35-37	32-34	Total
Number of students	4	10	15	18	20	12	13	92

Construct a frequency polygon for the above data.

OR

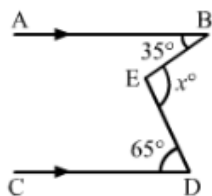
Draw a frequency polygon for the following distribution:

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	7	10	6	8	12	3	2	2

31. The polynomials  $ax^3 + 3x^2 - 3$  and  $2x^3 - 5x + a$  when divided by  $(x - 4)$  leave the remainders  $R_1$  and  $R_2$  respectively. Find the values of a if  $R_1 + R_2 = 0$  [3]

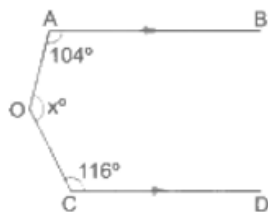
#### Section D

32. In each of the figures given below,  $AB \parallel CD$ . Find the value of  $x^\circ$  in each case. [5]



OR

In the given figure,  $AB \parallel CD$  and  $\angle AOC = x^\circ$ . If  $\angle OAB = 104^\circ$  and  $\angle OCD = 116^\circ$ , find the value of x.



33. An iron pillar consists of a cylindrical portion 2.8 m high and 20 cm in diameter and a cone 42 cm high is surmounting it. Find the weight of the pillar, given that  $1 \text{ cm}^3$  of iron weighs 7.5 g. [5]
34. Find the percentage increase in the area of a triangle if its each side is doubled. [5]

OR

The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150 m. Find the area of the triangle.

35. Find the integral roots of the polynomial  $f(x) = x^3 + 6x^2 + 11x + 6$ . [5]

#### Section E

36. Read the following text carefully and answer the questions that follow: [4]

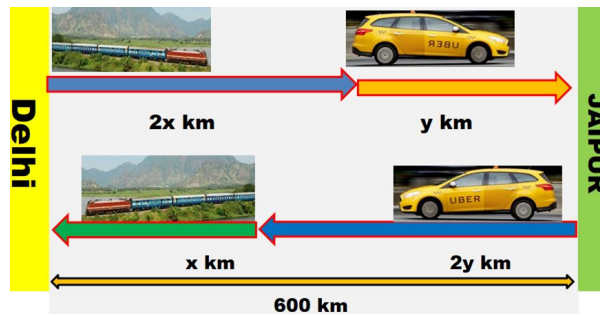
Ajay lives in Delhi, The city of Ajay's father in laws residence is at Jaipur is 600 km from Delhi. Ajay used to travel this 600 km partly by train and partly by car.

He used to buy cheap items from Delhi and sale at Jaipur and also buying cheap items from Jaipur and sale at

Delhi.

Once From **Delhi to Jaipur** in forward journey he covered  $2x$  km by train and the rest  $y$  km by taxi.

But, while returning he did not get a reservation from Jaipur in the train. So first  $2y$  km he had to travel by taxi and the rest  $x$  km by Train. From Delhi to Jaipur he took 8 hrs but in returning it took 10 hrs.



i. Write the above information in terms of equation. (1)

ii. Find the value of  $x$  and  $y$ ? (1)

iii. Find the speed of Taxi? (2)

**OR**

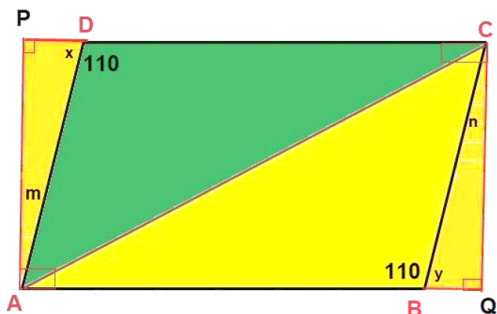
Find the speed of Train? (2)

37. Read the following text carefully and answer the questions that follow:

[4]

In the middle of the city, there was a park ABCD in the form of a parallelogram form so that  $AB = CD$ ,  $AB \parallel CD$  and  $AD = BC$ ,  $AD \parallel BC$ .

Municipality converted this park into a rectangular form by adding land in the form of  $\triangle APD$  and  $\triangle BCQ$ . Both the triangular shape of land were covered by planting flower plants.



i. Show that  $\triangle APD$  and  $\triangle BQC$  are congruent. (1)

ii. PD is equal to which side? (1)

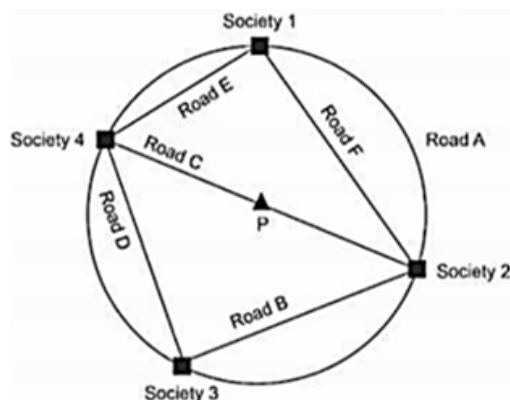
iii. Show that  $\triangle ABC$  and  $\triangle CDA$  are congruent. (2)

**OR**

What is the value of  $\angle m$ ? (2)

38. Two new roads, Road E and Road F were constructed between society 4 and 1 and society 1 and 2.

[4]



i. What would be the measure of the sum of angles formed by the straight roads at Society 1 and society 3?

- a.  $60^\circ$
  - b.  $90^\circ$
  - c.  $180^\circ$
  - d.  $360^\circ$
- ii. Krish says, The distance to go from society 4 to society 2 using Road D will be longer than the distance using Road E. Is Krish correct? Justify your answer with examples.
- iii. Road G, perpendicular to Road F was constructed to connect the park and Road F. Which of the following is true for Road G and Road F?
- a. Road G and road F are of same length.
  - b. Road F divides Road G into two equal parts.
  - c. Road G divides Road F into two equal parts.
  - d. The length of road G is one-fourth of the length of Road F.
- iv. Priya said, Minor arc corresponding to Road B is congruent to minor arc corresponding to Road D. Do you agree with Priya? Give reason to support your answer.

**Class IX Session 2024-25**  
**Subject - Mathematics**  
**Sample Question Paper - 4**

**Time Allowed: 3 hours**

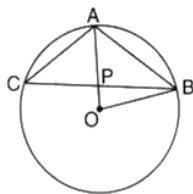
**Maximum Marks: 80**

### General Instructions:

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2. Section A has 20 MCQs carrying 1 mark each.
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7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

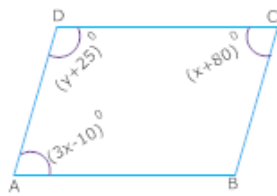
## Section A

1. Ordinate of all points on the y-axis is [1]  
a) 0  
b) -1  
c) any number  
d) 1
2. If the area of an isosceles right triangle is  $8 \text{ cm}^2$ , what is the perimeter of the triangle? [1]  
a)  $8 + 4\sqrt{2} \text{ cm}^2$   
b)  $8 + \sqrt{2} \text{ cm}^2$   
c)  $12\sqrt{2} \text{ cm}^2$   
d)  $4 + 8\sqrt{2} \text{ cm}^2$
3. In the given, AB is side of regular five sided polygon and AC is a side of a regular six sided polygon inscribed in the circle with centre O. AO and CB intersect at P, then  $\angle APB$  is equal to [1]



- a)  $90^\circ$   
c)  $86^\circ$
- b)  $72^\circ$   
d)  $96^\circ$
4. In the fig, ABCD is a Parallelogram. The values of x and y are [1]



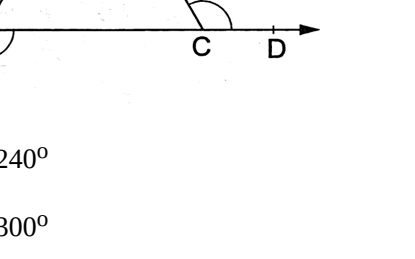


- a)  $45^\circ, 30^\circ$   
c)  $45^\circ, 45^\circ$

b)  $30^\circ, 35^\circ$   
d)  $55^\circ, 35^\circ$

5. The value of 1.9999..... in the form  $\frac{p}{q}$ , where 'p' and 'q' are integers and  $q \neq 0$ , is [1]  
a)  $\frac{1999}{1000}$   
b)  $\frac{19}{10}$   
c) 2  
d)  $\frac{1}{9}$

6. The sides BC, CA and AB of  $\triangle ABC$  have been produced to D, E and F respectively.  
 $\angle BAE + \angle CBF + \angle ACD = ?$  [1]



a)  $240^\circ$   
b)  $360^\circ$   
c)  $300^\circ$   
d)  $320^\circ$

7. **The cost of a notebook is twice the cost of a pen.** The equation to represent this statement is [1]  
a)  $2x = 3y$   
b)  $x = 3y$   
c)  $x + 2y = 0$   
d)  $x - 2y = 0$

8. The zeros of the polynomial  $p(x) = 3x^2 - 1$  are [1]  
a)  $\frac{1}{3}$  and 3  
b)  $\frac{1}{\sqrt{3}}$  and  $\frac{-1}{\sqrt{3}}$   
c)  $\frac{-1}{\sqrt{3}}$  and  $\sqrt{3}$   
d)  $\frac{1}{\sqrt{3}}$  and  $\sqrt{3}$

9. The value of  $(x^{a-b})^{a+b} \times (x^{b-c})^{b+c} \times (x^{c-a})^{c+a}$  is [1]  
a) 3  
b) 2  
c) 1  
d) 0

10. If a diagonal AC and BD of a quadrilateral ABCD bisect each other, then ABCD is a [1]  
a) Parallelogram  
b) Rhombus  
c) Rectangle  
d) Triangle

11. The value of  $\sqrt{3 - 2\sqrt{2}}$  is [1]  
a)  $\sqrt{2} + \sqrt{1}$   
b)  $\sqrt{2} - \sqrt{1}$   
c)  $\sqrt{3} + \sqrt{2}$   
d)  $\sqrt{3} - \sqrt{2}$

12.  $x = 2, y = 5$  is a solution of the linear equation [1]

a)  $5x + y = 7$

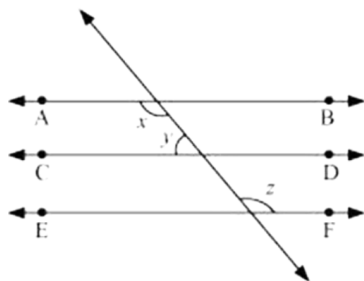
b)  $x + y = 7$

c)  $5x + 2y = 7$

d)  $x + 2y = 7$

13. In the given figure,  $AB \parallel CD$ ,  $CD \parallel EF$  and  $y : z = 3 : 7$ , then  $x = ?$

[1]



a)  $63^\circ$

b)  $126^\circ$

c)  $108^\circ$

d)  $162^\circ$

14. If  $x = \sqrt{5} + 2$ , then  $x - \frac{1}{x}$  equals

[1]

a) 2

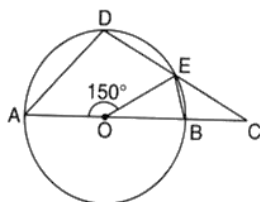
b) 4

c)  $2\sqrt{5}$

d)  $\sqrt{5}$

15. AOB is the diameter of the circle. If  $\angle AOE = 150^\circ$ , then the measure of  $\angle CBE$  is

[1]



a)  $115^\circ$

b)  $125^\circ$

c)  $120^\circ$

d)  $105^\circ$

16. A point of the form  $(0, b)$  lies on:

[1]

a) x- axis

b) quadrant I

c) quadrant III

d) y- axis

17. If a linear equation has solutions  $(-2, 2)$ ,  $(0, 0)$  and  $(2, -2)$ , then it is of the form:

[1]

a)  $x + y = 0$

b)  $-2x + y = 0$

c)  $x - y = 0$

d)  $-x + 2y = 0$

18. The maximum number of zeroes that a polynomial of degree 3 can have is

[1]

a) Zero

b) One

c) Two

d) Three

19. **Assertion (A):** In  $\triangle ABC$ , E and F are the midpoints of AC and AB respectively. The altitude AP at BC intersects FE at Q. Then,  $AQ = QP$ .

[1]

**Reason (R):** Q is the midpoint of AP.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):**  $5 - \sqrt{2} = 5 - 1.414 = 3.586$  is an irrational number.

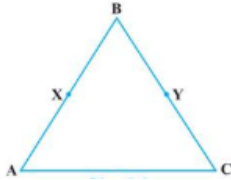
[1]

**Reason (R):** The difference of a rational number and an irrational number is an irrational number.

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.      d) A is false but R is true.

### Section B

21. Point C is called a mid point of line segment AB, prove that every line segment has one and only one mid-point. [2]
22. In the given figure, we have  $BX = \frac{1}{2}AB$  and  $BY = \frac{1}{2}BC$  and  $AB = BC$ . Show that  $BX = BY$ . [2]



23. Name the quadrant in which the point lies : (i) A(1, 1) (ii) (-2, -4) (iii) C(1, -2). [2]
24. Find two rational and two irrational numbers between 0.5 and 0.55. [2]

OR

Express the decimal  $0.\overline{235}$  in the form  $\frac{p}{q}$ , where p, q are integers and  $q \neq 0$ .

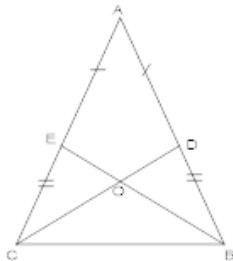
25. Curved surface area of a cone is  $308 \text{ cm}^2$  and its slant height is 14 cm. Find the radius of the base. [2]

OR

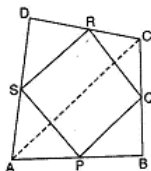
If the radius and slant height of a cone are in the ratio 7 : 13 and its curved surface area is  $286 \text{ cm}^2$ , find its radius.

### Section C

26. Find the value of  $\frac{4}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{2}{(243)^{-\frac{1}{5}}}$  [3]
27. If  $AE = AD$  and  $BD = CE$ . Prove that  $\triangle AEB \cong \triangle ADC$  [3]

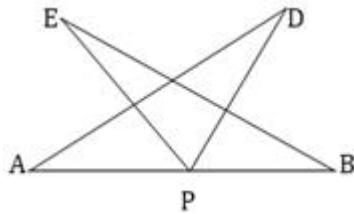


28. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that [3]
- $SR \parallel AC$  and  $SR = \frac{1}{2}AC$
  - $PQ = SR$
  - PQRS is a parallelogram.



29. Find at least 3 solutions for the linear equation  $2x - 3y + 7 = 0$ . [3]
30. AB is a line segment and P is the mid-point. D and E are points on the same side of AB such that  $\angle BAD = \angle ABE$  and  $\angle EPA = \angle DPB$ . Show that: [3]
- $\triangle DAP \cong \triangle EBP$

ii.  $AD = BE$  (See figure)



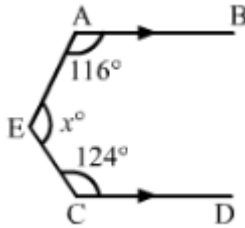
OR

ABC is an isosceles triangle in which  $AB = AC$ . BE and CF are its two medians. Show that  $BE = CF$ .

31. If  $x + y + z = 0$ , show that  $x^3 + y^3 + z^3 = 3xyz$ . [3]

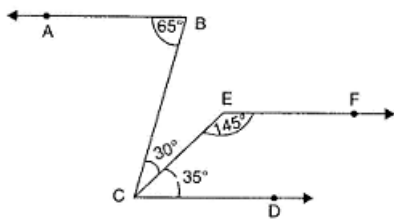
#### Section D

32. In each of the figures given below,  $AB \parallel CD$ . Find the value of  $x^\circ$  in each other case. [5]



OR

In figure,  $\angle ABC = 65^\circ$ ,  $\angle BCE = 30^\circ$ ,  $\angle DCE = 35^\circ$  and  $\angle CFE = 145^\circ$ . Prove that  $AB \parallel EF$ .



33. Prove that the line joining the mid-points of the diagonals of a trapezium is parallel to each of the parallel sides and is equal to half of the difference of these sides. [5]
34. The perimeter of a triangular field is 420 m and its sides are in the ratio 6 : 7 : 8. Find the area of the triangular field. [5]

OR

The perimeter of a right triangle is 24 cm. If its hypotenuse is 10 cm, find the other two sides. Find its area by using the formula area of a right triangle. Verify your result by using Heron's formula.

35. Factorize:  $x^3 - 2x^2 - x + 2$  [5]

#### Section E

36. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and a height of 1 m. [4]



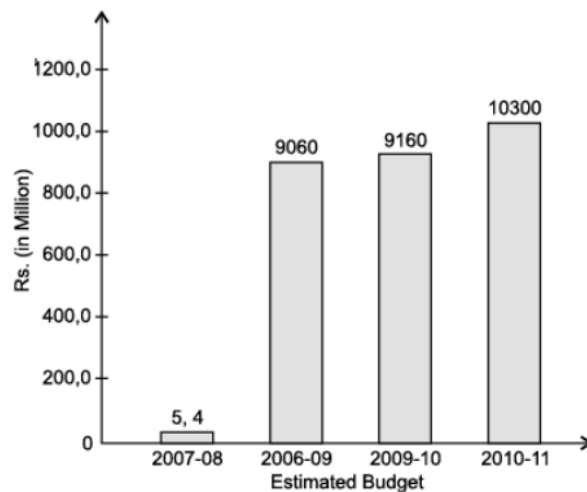
- i. Find the curved surface area of the cone.
- ii. If the outer side of each of the cones is to be painted and the cost of painting is ₹ 12 per  $m^2$ , what will be the cost of painting all these cones? (Use  $\pi = 3.14$  and take  $\sqrt{1.04} = 1.02$ )

37. Read the following text carefully and answer the questions that follow:

[4]

Ladli Scheme was launched by the Delhi Government in the year 2008. This scheme helps to make women strong and will empower a girl child. This scheme was started in 2008.

The expenses for the scheme are plotted in the following bar chart.



- What are the total expenses from 2009 to 2011? (1)
- What is the percentage of no of expenses in 2009-10 over the expenses in 2010-11? (1)
- What is the percentage of minimum expenses over the maximum expenses in the period 2007-2011? (2)

**OR**

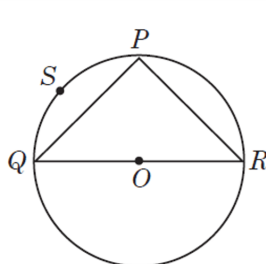
What is the difference of expenses in 2010-11 and the expenses in 2006-09? (2)

38. Read the following text carefully and answer the questions that follow:

[4]

Sanjay and his mother visited in a mall. He observes that three shops are situated at P, Q, R as shown in the figure from where they have to purchase things according to their need. Distance between shop P and Q is 8 m and between shop P and R is 6 m.

Considering O as the center of the circles.



- Find the Measure of  $\angle QPR$ . (1)
- Find the radius of the circle. (1)
- Find the Measure of  $\angle QSR$ . (2)

**OR**

Find the area of  $\triangle PQR$ . (2)