



# DELHI PUBLIC SCHOOL, CHANDIGARH

Annual Examination, Session 2023-24

Class: IX, Subject: Maths (Set 2)

Time: 3 hrs

MM: 80

## General Instructions:

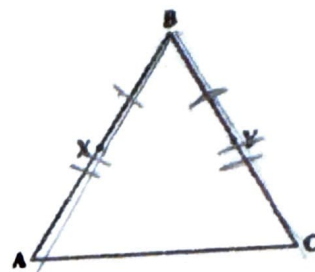
1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.
7. Draw neat figures wherever required.

## Section – A

1. The rationalising factor of  $\sqrt{2} - \sqrt{7}$  is  
a)  $\sqrt{2} - \sqrt{7}$       b)  $\sqrt{2} + \sqrt{7}$       c)  $\sqrt{2} + 7$       d)  $2 + \sqrt{7}$
2. If m and n are two natural numbers and  $m^n = 81$ , then  $n^{mn}$  is  
a)  $4^3$       b)  $3^4$       c)  $3^{12}$       d)  $4^{12}$
3. The value of a for which the polynomial  $4x^4 + 2x^3 - 3x^2 - ax - 16$  has  $(-1)$  as its zero, is  
a)  $-18$       b)  $17$       c)  $19$       d)  $-20$
4. The point which lies on x – axis at a distance of 5 units in the negative direction of x – axis is  
a)  $(0, 5)$       b)  $(0, -5)$       c)  $(5, 0)$       d)  $(-5, 0)$
5. The quadrants in which abscissa and ordinate have opposite signs, will lie in  
a) I and II quadrants      c) II and III quadrants  
b) I and III quadrants      d) II and IV quadrants
6. If  $(2, 3)$  is a solution of the equation  $3x + 5y = k$ , then the value of k is  
a) 15      b) 21      c) 29      d) 26
7. The graph of the linear equation  $x = 4$  is a line  
a) parallel to x – axis at a distance of 4 units from the origin.  
b) parallel to y – axis at a distance of 4 units from the origin.  
c) which cuts x – axis at distance of 4 units.  
d) which cuts y – axis at distance of 4 units.

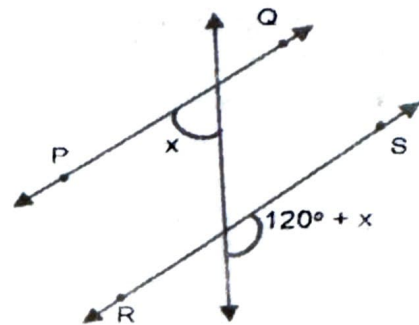
8. In the given figure,  $BX = BY$  and  $BA = BC$ , then

- a)  $CY = AB$
- b)  $BY = AB$
- c)  $AX = BC$
- d)  $AX = CY$

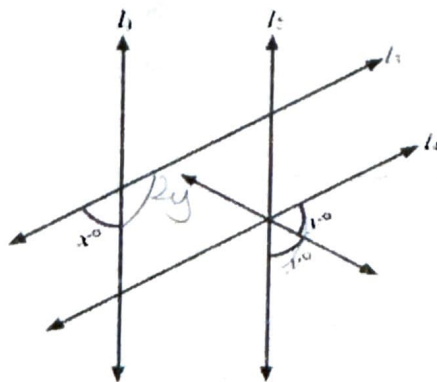


9. In the given figure, if  $PQ \parallel RS$ , then the value of  $x$  is

- a)  $20^\circ$
- b)  $30^\circ$
- c)  $40^\circ$
- d)  $50^\circ$



10 In the given figure, if  $l_1 \parallel l_2$  and  $l_3 \parallel l_4$ , the value of  $y$  in terms of  $x$  is



- a)  $90^\circ + x$
- b)  $90^\circ + 2x$
- c)  $90^\circ - 2x$
- d)  $90^\circ - \frac{x}{2}$

11. Side BC of a  $\Delta PQR$  has been produced to a point S such that  $\angle PRS = 150^\circ$ .

If  $\angle Q = \frac{1}{2}\angle P$ , then the value of  $\angle P$  is

- a)  $80^\circ$
- b)  $100^\circ$
- c)  $60^\circ$
- d)  $90^\circ$

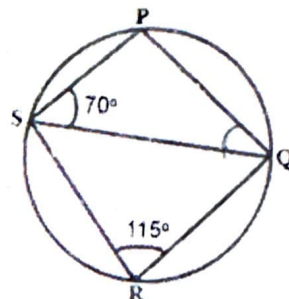
12. Three angles of a quadrilateral are  $80^\circ$ ,  $75^\circ$  and  $112^\circ$ . The value of the fourth angle is

- a)  $78^\circ$
- b)  $93^\circ$
- c)  $87^\circ$
- d)  $100^\circ$

13. In the given figure, PQRS is a cyclic quadrilateral.

If  $\angle QRS = 115^\circ$  and  $\angle PSQ = 70^\circ$ , then  $\angle PQS$  is equals to

- a)  $65^\circ$
- b)  $55^\circ$
- c)  $45^\circ$
- d)  $50^\circ$



14. If the area of an equilateral triangle is  $p^2\sqrt{3} \text{ cm}^2$ , then the side of the triangle is  
 a) ~~4p~~ cm      b) 2p cm      c) p cm      d) 3 cm
15. If the ratio of the volumes of the two spheres is 64 : 125, then the ratio of their radii is  
 a) 8 : 5      b) 16 : 25      c) 8 : 25      ~~d) 4 : 5~~
16. If the volume of right circular cone of height 9 cm, is  $48\pi \text{ cm}^3$ , then the radius of the base is  
 a) 8 cm      b) 6 cm      ~~c) 4~~ cm      d) 12 cm
17. If each data in the observation is decreased by 7, then the mean  
 a) remains the same      ~~c) increases by 7~~  
 b) decreases by 7      d) multiplies by 7
18. The class mark of the class interval 70 – 90 is  
 a) 90      b) 70      ~~c) 80~~      d) 20

**Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

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

19. **Assertion:** If  $(x + 7)$  is a factor of  $f(x) = x^2 + 11x - 2a$ , then  $a = -14$ .

**Reason:** If  $x + a$  is a factor of a polynomial, then  $f(a) = 0$  (d)

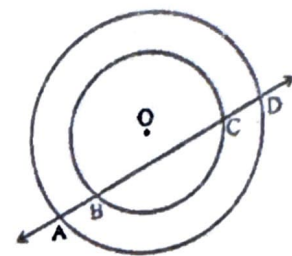
20. **Assertion:** The perpendicular distance of the point A (2, -5) from the x-axis is 5.

**Reason:** The perpendicular distance of a point from x-axis is its x-coordinate. (d)

### Section – B

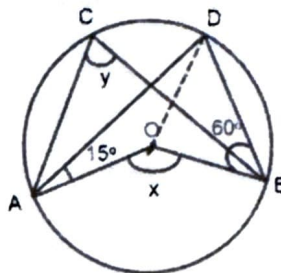
21. Express  $3.\overline{25}$  in the form of  $\frac{p}{q}$ .  $\frac{322}{99}$
22. Write the coordinates of the points where the graph of the linear equation  $4x + 6y = 8$  intersects X and Y-axis? (2,0)
23. If a point P lies between two points M and N such that  $MP = NP$ , then prove that  $MP = \frac{1}{2} MN$ . Explain by drawing the figure.

24. In the given figure, if a line intersects two concentric circles with centre O at A, B, C and D, then prove that  $AB = CD$ .



OR

In the given figure, O is the centre of the circle,  $\angle DAO = 15^\circ$  and  $\angle DBO = 60^\circ$ , then find the values of 'x' and 'y'.



25. A hemispherical dome of a building needs to be painted. If the radius of the base of the dome is 420 cm, then find the cost of painting it if the cost of painting is ₹ 5 per  $100 \text{ cm}^2$  ₹55440

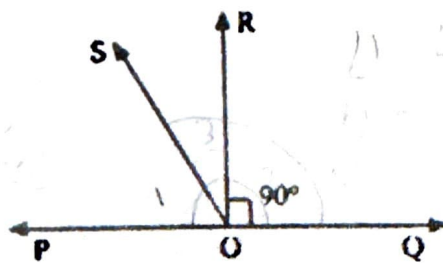
### Section - C

26. If both  $(x + 1)$  and  $(x - 1)$  are the factors of  $px^3 + x^2 - 2x + q$ , then find the values of 'p' and 'q'.  $p = 2, q = -1$

OR

If  $x + \frac{1}{x} = 8$ , then find the value of  $x^3 + \frac{1}{x^3}$

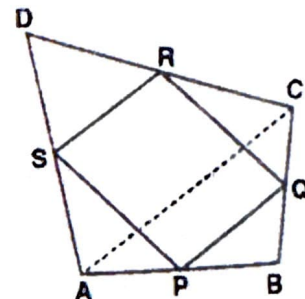
27. Find three different solutions of the equation  $2x - y = 6$   $(0, -6), (-1, -8), (1, 4)$
28. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that  $\angle ROS = \frac{1}{2} (\angle QOS - \angle POS)$ .



29. 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:

(i)  $SR \parallel AC$  and  $SR = \frac{1}{2} AC$

(ii) PQRS is a parallelogram



30. Sides of a given triangle are in the ratio of 12: 17: 25, and the perimeter is 540cm. Find the area of the triangle 9000

31. A metallic sphere of radius 10.5 cm is melted and thus recast into small cones, each of radius 3.5 cm and height 3 cm. Find how many cones are obtained. 126

OR

The circumference of the base of a 10 m high conical tent is 44 m. Calculate the length of the canvas used in making the tent if width of the canvas is 2m. (Use  $\sqrt{149} = 12.2$ )

### Section - D

32. If  $\frac{5+4\sqrt{3}}{2-\sqrt{3}} = a + b\sqrt{3}$ , then find the value of a and b.

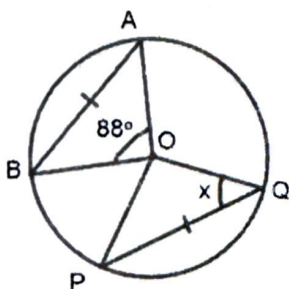
$a=22, b=13$

OR

Simplify :  $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{2}} - \frac{3}{\sqrt{5}+\sqrt{2}}$

33. Factorise:  $y^3 - 10y^2 - 53y - 42$  —  $(y+1)(y+3)(y-14)$

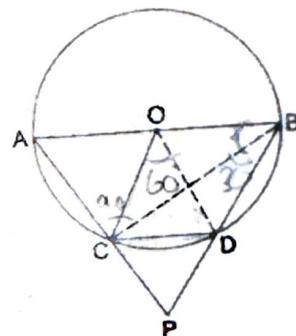
34. Prove that equal chords of a circle subtend equal angles at the centre. Also, in the given figure, O is the centre of the circle and  $AB = PQ$ . Find the value of angle 'x'.



OR

In the given figure, AB is a diameter of a circle, chord CD is equal to the radius of the circle. AC and BD when produced meet in point P.

Prove that  $\angle APB = 60^\circ$ .



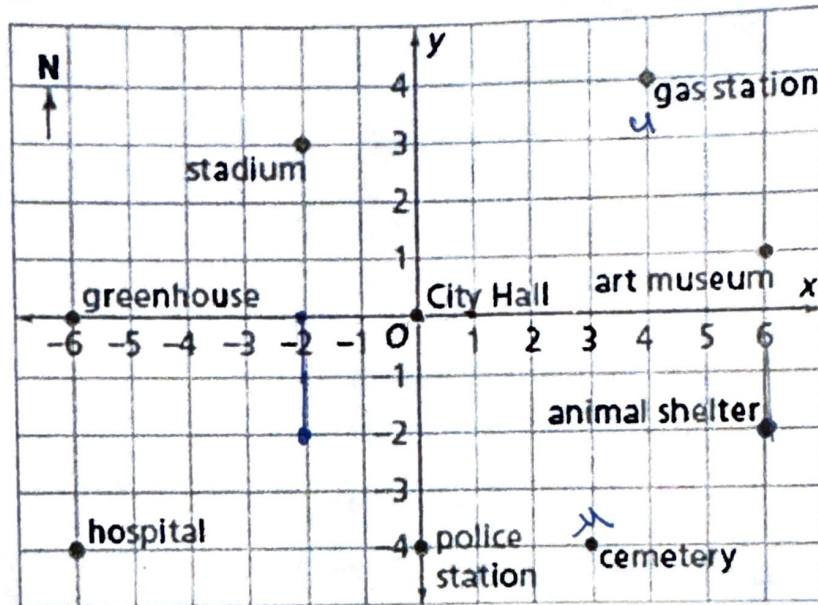
35. The following table shows a frequency distribution for the speed of cars passing through at a particular spot on a highway:

Speed (km/hr)	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Number of cars	16	9	27	65	32

Draw a frequency polygon of the given data.

## SECTION E

36. Planning a city involves a multi-faceted process that encompasses various disciplines such as urban design, architecture, engineering, economics, sociology, and environmental science. Use this information and the given map to answer the following questions. Use this information and the given map to answer the following questions:

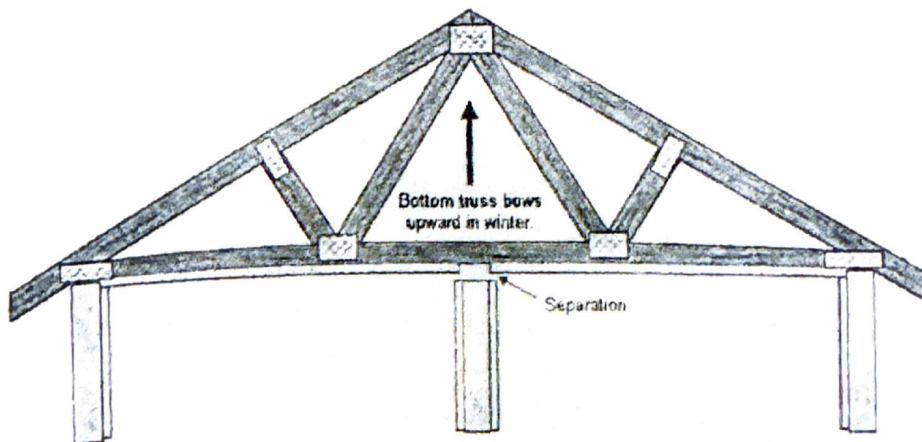


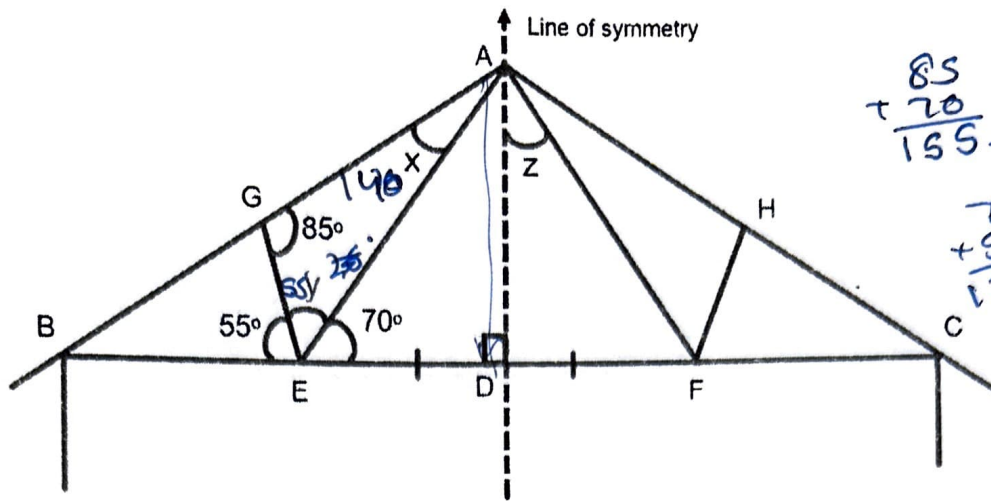
- Give the coordinates of the animal shelter as shown on the given map.  $(6, -2)$
- Angad walks 3 blocks west from the City Hall and then walks 2 blocks south. Give the coordinates of the place where he stops.  $(-3, -2)$
- In the city of Euclid, if the length of each block is 5 meters, what is the distance between hospital and police station. Write the answer in kilometers?

OR

- Find the value of (abscissa of gas house) - (ordinate of cemetery)  $4 - (-4) = 8$

37. Roof trusses provide support for the roofs. These are strong because they make use of the most efficient shape - Triangle. Roof truss in the figure below is a symmetrical wooden structure having triangular webbing connected by gusset plates.





$$\begin{array}{r} 85 \\ + 70 \\ \hline 155 \end{array} \quad \begin{array}{r} 180 \\ - 155 \\ \hline 25 \end{array} \quad \begin{array}{r} 85 \\ + 55 \\ \hline 140 \end{array}$$

$$\begin{array}{r} 76 \\ + 55 \\ \hline 125 \end{array} \quad \begin{array}{r} 180 \\ - 125 \\ \hline 55 \end{array}$$

Based on the above information, answer the following questions:

- Is  $\triangle AED \cong \triangle AFD$ ? Give reason to support your answer.  $\frac{1}{2}$  RMS (1)
- Calculate the value of angle  $y$ . 55 (1)
- If  $\angle ADE = 90^\circ$ , then find the value of angle  $z$ . (2)

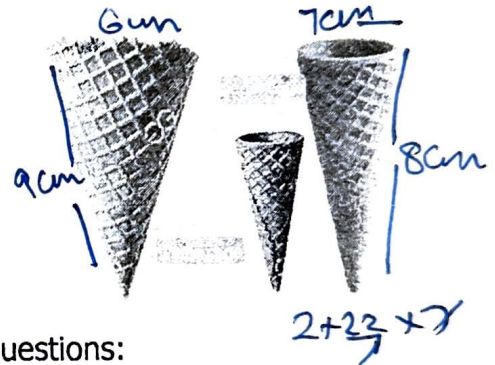
OR

- Calculate the value of angle  $x$ ,  $40^\circ$  (2)

38. A local ice cream vendor, Mr. Sundar, is known for selling delicious ice cream cones. He offers two types of cones: Cone A and Cone B.

**Cone A (Waffle cone)** has a radius of 6 cm and a height of 9 cm.

**Cone B (sugar cone)** has a radius of 7 cm and a height of 8 cm.



Based on the above information, answer the following questions:

- Calculate the circumference of the base of cone B.  $2\pi r \rightarrow 44$  (1)
- Write the formula to calculate the total surface area of a cone.  $\pi r (2 + h)$  (1)
- Calculate the ratio of the volume of cone A to the volume of cone B.  $\frac{81 \cdot 98}{98}$  (1)

OR

- Which cone has greater slant height? Give reasons to support your answer. (2)