Class IX Session 2024-25
Subject - Mathematics
Sample Question Paper - 8

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 π =22/7 wherever required if not stated.

Section A

1. If x = $2+\sqrt{3}$, then $x+\frac{1}{x}$ = **[1]**

   a) 4 b) -5

   c) -4 d) 5

2. For what value of 'k', x = 2 and y = -1 is a solution of x + 3y – k = 0? **[1]**

   a) 2 b) -2

   c) -1 d) 1

3. A(-6, 3) be a point on the graph. Draw $AL \perp x-axis$. The co-ordinates of L are **[1]**

   a) (-6, 3) b) (0, 0)

   c) (-6, 0) d) (0, -6)

4. In a histogram the area of each rectangle is proportional to **[1]**

   a) the class size of the corresponding class interval
   b) cumulative frequency of the corresponding class interval
   c) the class mark of the corresponding class interval
   d) frequency of the corresponding class interval

5. The equation x = 7 in two variables can be written as **[1]**

   a) 1.x + 1.y = 7 b) 1.x + 0.y = 7

   c) 0.x + 1.y = 7 d) 0.x + 0.y = 7

6. A and B have the same weight. If they gain weight by 3 kg, then **[1]**

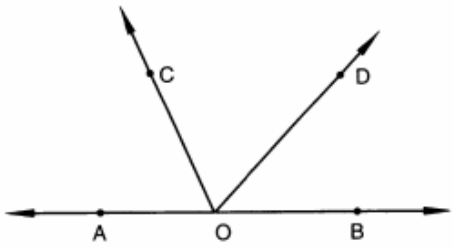
a) Weight of A $\neq$ Weight of B

b) Weight of A > Weight of B

c) Weight of A < Weight of B

d) Weight of A = Weight of B

7. In Fig. *AOB* is a straight line. If $\angle AOC + \angle BOD = 85°$, then $\angle COD =$ **[1]**



a) 100°

b) 85°

c) 90°

d) 95°

8. If one angle of a parallelogram is 24^o less than twice the smallest angle, then the measure of the largest angle of the parallelogram is **[1]**

a) 112^o

b) 68^o

c) 176^o

d) 102^o

9. If $a^2 + b^2 + c^2 = 30$ and a + b + c = 10, then the value of ab + bc + ca is **[1]**

a) 30

b) 25

c) 35

d) 40

10. Which of the following is not a solution of 2x – 3y = 12? **[1]**

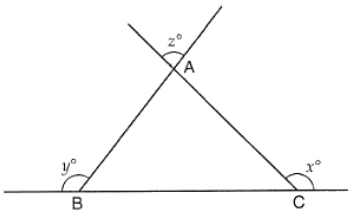
a) (0, -4)

b) (2, 3)

c) (6, 0)

d) (3, -2)

11. In figure, what is z in terms of x and y? **[1]**



a) x + y - 180°

b) x + y + 180°

c) x + y + 360°

d) 180° - (x + y)

12. In $\triangle ABC$, EF is the line segment joining the mid-points of the sides AB and AC. BC = 7.2 cm, Find EF. **[1]**

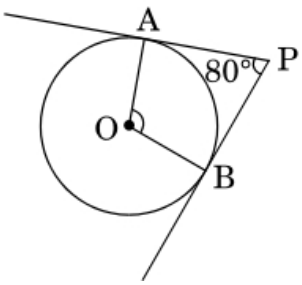
a) 2.6 cm

b) 3.5 cm

c) 3.6 cm

d) 3.4 cm

13. In Figure, if tangents PA and PB from an external point P to a circle with centre O, are inclined to each other at an angle of 80^o, then is equal to **[1]**



a) 100^o b) 60^o

c) 50^o d) 80^o

14. Read the statements carefully. **[1]**

Statement-1: The product of a rational and an irrational number is an irrational number.

Statement 2: Reciprocal of every rational number is a rational number.

a) Statement-1 is false but Statement-2 is true. b) Statement-1 is true but Statement-2 is false.

c) Both Statement-1 and Statement-2 are false. d) Both Statement-1 and Statement-2 are true.

15. The positive solutions of the equation ax + by + c = 0 always lie in the **[1]**

a) 3rd quadrant b) 4th quadrant

c) 2nd quadrant d) 1st quadrant

16. In ΔABC and ΔDEF its is given that $\angle B = \angle E$ and $\angle C = \angle F$ in order that $\Delta ABC \cong \Delta DEF$ we must have **[1]**

a) BC = EF b) $\angle A = \angle D$

c) AB = DF d) AC = DE

17. If $\left(3x + \frac{1}{2}\right)\left(3x - \frac{1}{2}\right)$ = $9x^2$ - p then the value of p is **[1]**

a) $\frac{1}{4}$ b) $-\frac{1}{4}$

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

18. The volume of a spherical shell is given by **[1]**

a) $\frac{4}{3}\pi(R^3 - r^3)$ b) $\pi(R^3 - r^3)$

c) $\frac{4}{3}\pi(R^2 - r^2)$ d) $4\pi(R^3 - r^3)$

19. **Assertion (A):** The perimeter of a right angled triangle is 60 cm and its hypotenuse is 26 cm. The other sides of the triangle are 10 cm and 24 cm. Also, area of the triangle is 120 cm^2. **[1]**

Reason (R): $(Base)^2 + (Perpendicular)^2 = (Hypotenuse)^2$

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):** There are infinite number of lines which passes through (2, 14). **[1]**

Reason (R): A linear equation in two variables has infinitely many solutions.

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.

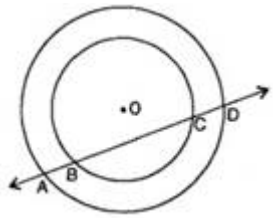
d) A is false but R is true.

Section B

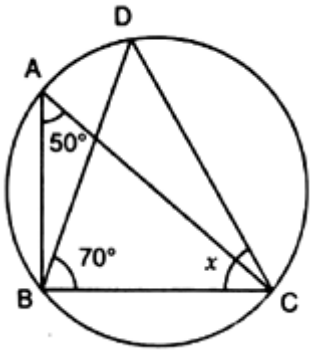
21. Prove the exterior angle formed by producing a side of a cyclic quadrilateral is equal to the interior opposite angle. **[2]**

22. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle. **[2]**

23. If a line intersects two concentric circles (circles with the same centre) with centre O at A, B, C and D, prove that AB = CD. **[2]**

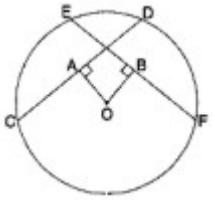


24. If O is the centre of the circle, find the value of x in the given figure: **[2]**



OR

In figure, OA and OB are respectively perpendiculars to chords CD and EF of a circle whose centre is O. If OA = OB, prove that $\overline{EC} \cong \overline{DF}$.



25. Write two solutions of the form x = 0, y = a and x = b, y = 0 : -4x + 3y = 12 **[2]**

OR

Express the linear equation y - 2 = 0 in the form ax + by + c = 0 and indicate the value of a, b and c in case.

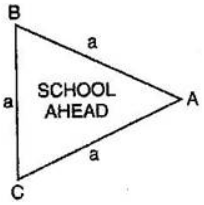
Section C

26. Rationalise the denominator: $\frac{1}{\sqrt{7}+\sqrt{6}-\sqrt{13}}$ **[3]**

27. Factorize the polynomial: **[3]**

$8a^3 - b^3 - 12a^2b + 6ab^2$

28. A traffic signal board, indicating SCHOOLAHEAD is an equilateral triangle with side a Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board? **[3]**

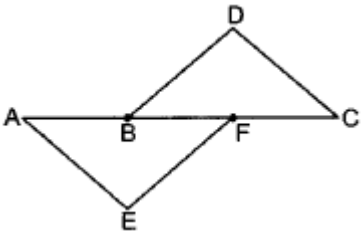


OR

Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs7 per m^2.

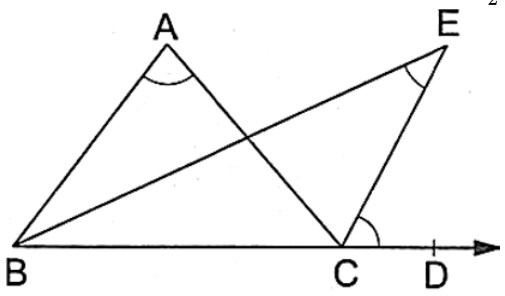
29. A cylinder, a cone and a sphere are of the same radius and same height. Find the ratio of their curved surface. **[3]**

30. In given figure, it is given that AB = CF, EF = BD and ∠AFE = ∠CBD. Prove that △AFE ≅ △CBD. **[3]**

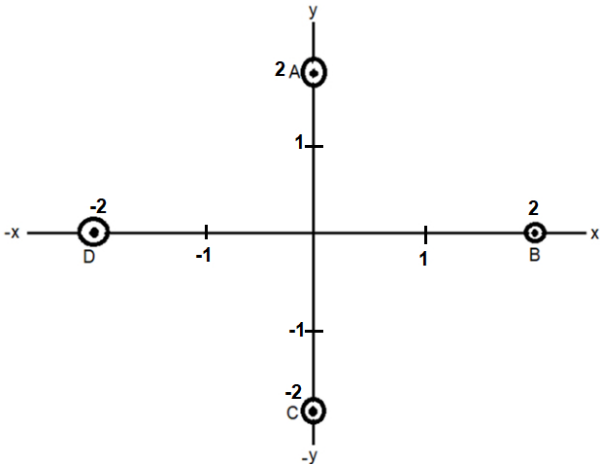


OR

In the given figure, the side BC of △ABC has been produced to a point D. If the bisectors of ∠ABC and ∠ACD meet at point E then prove that $\angle BEC = \frac{1}{2}\angle BAC$.



31. In fig. write the Co-ordinates of the points and if we join the points write the name of fig. formed. Also write Co-ordinate of intersection point of AC and BD. **[3]**



Section D

32. If $p = \frac{3-\sqrt{5}}{3+\sqrt{5}}$ and $q = \frac{3+\sqrt{5}}{3-\sqrt{5}}$, find the value of $p^2 + q^2$. **[5]**

OR

Find the values of a and b if $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + b\sqrt{5}$.

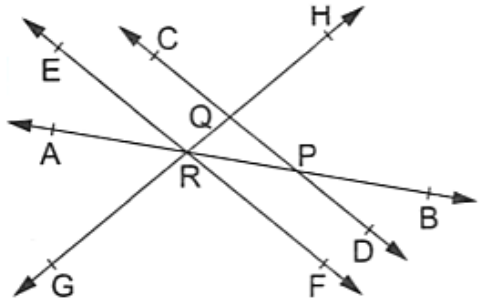
33. In the adjoining figure, name: **[5]**

i. Two pairs of intersecting lines and their corresponding points of intersection

ii. Three concurrent lines and their points of intersection

iii. Three rays

iv. Two line segments

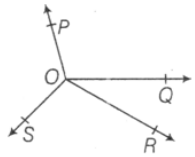


34. If is given that $\angle XYZ = 64^\circ$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ∠ZYP, find ∠XYQ and reflex ∠QYP. **[5]**

OR

In the given figure, OP, OQ, OR and OS are four rays. Prove that

∠POQ + ∠ROQ + ∠SOR + ∠POS = 360°.



35. The lengths of 62 leaves of a plant are measured in millimetres and the data is represented in the following table: **[5]**

Length (in mm)	Number of leaves
118 - 126	8
127 - 135	10
136 - 144	12
144 - 153	17
154 - 162	7
163 - 171	5
172 - 180	3

Draw a histogram to represent the data above.

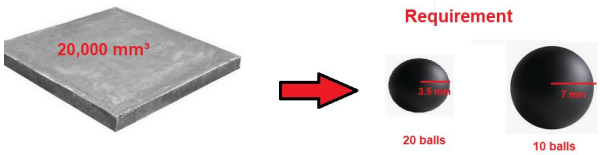
Section E

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

In Agra in a grinding mill, there were installed 5 types of mills. These mills used steel balls of radius 5 mm, 7 mm, 10 mm, 14 mm and 16 mm respectively. All the balls were in the spherical shape.

For repairing purpose mills need 10 balls of 7 mm radius and 20 balls of 3.5 mm radius. The workshop was having 20000 mm^3 steel.

This 20000 mm^3 steel was melted and 10 balls of 7 mm radius and 20 balls of 3.5 mm radius were made and the remaining steel was stored for future use.



i. What was the volume of one ball of 3.5 mm radius? (1)

ii. What was the surface area of one ball of 3.5 mm radius? (1)

iii. What was the volume of 10 balls of radius 7 mm? (2)

OR

How much steel was kept for future use? (2)

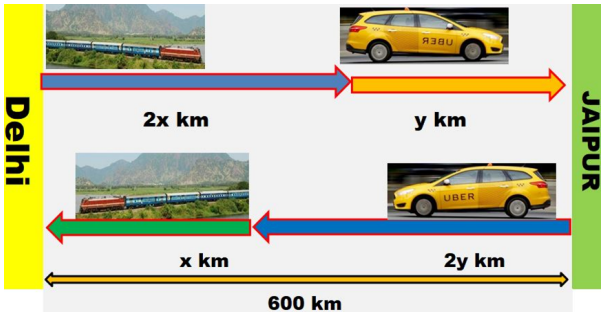
37. **Read the following text carefully and answer the questions that follow:** **[4]**

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)

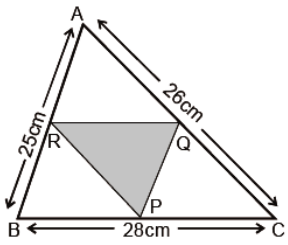
iii. Find the speed of Taxi? (2)

OR

Find the speed of Train? (2)

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

There is a Diwali celebration in the DPS school Janakpuri New Delhi. Girls are asked to prepare Rangoli in a triangular shape. They made a rangoli in the shape of triangle ABC. Dimensions of △ABC are 26 cm, 28 cm, 25 cm.



i. In fig R and Q are mid-points of AB and AC respectively. Find the length of RQ. (1)

ii. Find the length of Garland which is to be placed along the side of △QPR. (1)

iii. R, P and Q are the mid-points of AB, BC, and AC respectively. Then find the relation between area of △PQR and area of △ABC. (2)

OR

R, P, Q are the mid-points of corresponding sides AB, BC, CA in ΔABC, then name the figure so obtained BPQR. (2)