

Directorate of Education, GNCT of Delhi

Practice Paper- (2023-24)

Class – IX

Mathematics

Time Allowed: 3 Hrs.

Maximum Marks: 80

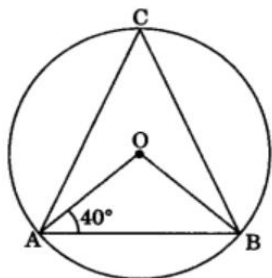
General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 sourced based/Case Based/passage based/integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions of 3 marks and 2 Questions of 5 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

Q 1-20 are multiple choice questions. Each question is of 1 mark.

1. The rational numbers between $\sqrt{2}$ and $\sqrt{3}$ is:
a. $\sqrt{2} \times \sqrt{3}$
b. $\sqrt{5}$
c. $\sqrt{4}$
d. $6^{1/4}$
2. Circles having the same centre and different radii are called----- circles:
a. concentric
b. chord
c. diameter
d. cyclic
3. If $(x+2)$ is factor of the polynomial $x^2-kx+14$ then the value of k is:
a. -9
b. 9
c. -2
d. 14
4. The radius of a hemispherical balloon increases from 6cm to 12cm as air is being pumped into it. The ratios of the surface areas of the balloon in the two cases are:
a. 1: 4
b. 1: 3
c. 2: 3
d. 2: 1
5. In the given figure, O is the centre of the circle. If $\angle OAB = 40^\circ$ and C is a point on the circle then, $\angle ACB$ is:



- a. 50°
- c. 85°

- b. 77°
- d. 60°

6. All right angles are equal to one another. This is which of the Euclid's postulate:

- a. Euclid's postulate 4
- b. Euclid's postulate 1
- c. Euclid's postulate 5
- d. Euclid's postulate 3

7. If in a parallelogram its diagonals bisect each other and are equal then it is a:

- a. square
- b. Rectangle
- c. Rhombus
- d. Parallelogram

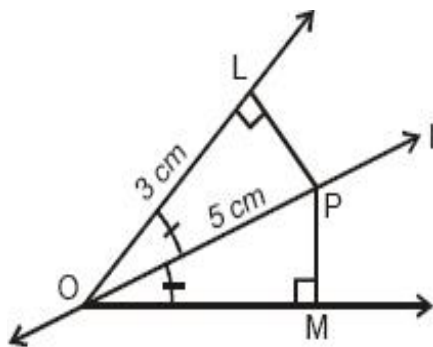
8. The value of the polynomial $5x - 4x^2 + 3$, when $x = -1$ is:

- a. -6
- b. 6
- c. 2
- d. -2

9. Equation of the line passing through the origin is:

- a. $7y - x = 0$
- b. $x + y = 0$
- c. $-2x + y = 0$
- d. $-3x + 2y = 0$

10. In the given figure, the length of PM is:

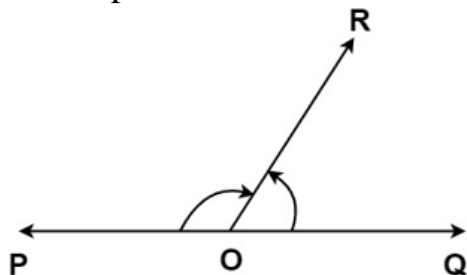


- a. 4cm
- b. 6cm
- c. 3cm
- d. 2cm

11. Three angles of a quadrilateral are 75° , 90° and 75° . The fourth angle is:

- a. 90°
- b. 95°
- c. 105°
- d. 120°

12. In the given figure, which pair do the $\angle POR$ and $\angle ROQ$ form?



- a. Reflex angle
- b. Complementary
- c. Linear
- d. Vertically opposite

13. The sides of a triangle are 122 m, 22 m and 120 m respectively. The area of the triangle is:

a. 1320 sq.m

c. 1400 sq.m

b. 1300 sq.m

d. 1420 sq.m

14. If $x = 2 + \sqrt{3}$, then value of $\frac{1}{x}$ is:

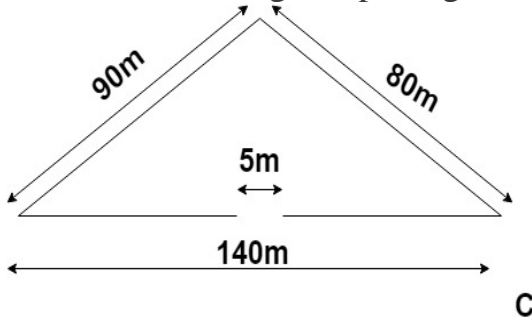
a. $\frac{1}{2 + \sqrt{3}}$

c. $\sqrt{3}$

b. $2 - \sqrt{3}$

d. $\frac{1}{2 - \sqrt{3}}$

15. A triangular garden has sides 90m, 140m and 80m. A fence is to be put all around the garden. What will be the total cost of fencing at the rate of Rs 15 per metre if a 5m wide space is to be left on the one side for gate opening.



a. ₹ 4525

c. ₹ 4575

b. ₹ 4975

d. ₹ 4230

16. The linear equation $3x - 11y = 10$ has:

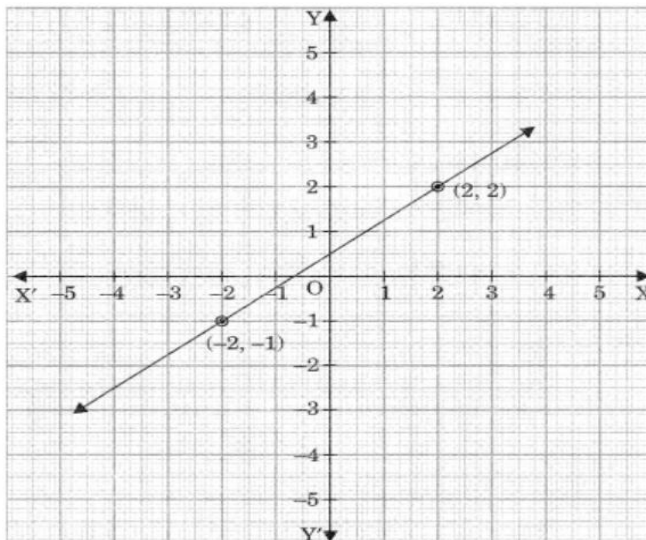
a. Unique solution

c. Infinitely many solutions

b. Two solutions

d. No solutions

17. To which equation does the given graph represent?



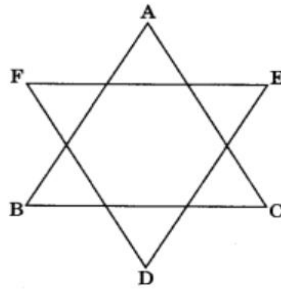
a. $y - x = 0$

c. $7x + y = 0$

b. $6x + 3y = 0$

d. $3x - 4y = -2$

18. In the given figure $\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = k$ right angles, then the value of k is:



- a. 8
- c. 3

- b. 5
- d. 4

19. **Assertion:** According to Euclid's 1st axiom- "Things which are equal to the same thing are also equal to one another".

Reason: If $AB = PQ$ and $PQ = XY$, then $AB = XY$

- a. Both Assertion and reason are correct and reason is correct explanation for Assertion
- b. Both Assertion and reason are correct but reason is not correct explanation for Assertion
- c. Assertion is correct but reason is false
- d. Both Assertion and reason are false

20. **Assertion:** The polynomial $p(x) = 5x - 1/2$ is a linear polynomial.

Reason: The general form of linear polynomial is $ax + b$

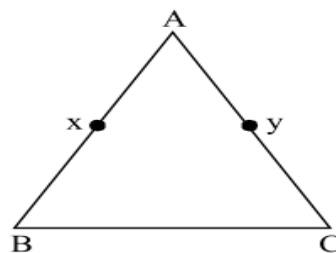
- a. Both Assertion and reason are correct and reason is correct explanation for Assertion
- b. Both Assertion and reason are correct but reason is not correct explanation for Assertion
- c. Assertion is correct but reason is false
- d. Both Assertion and reason are false

SECTION B

Section -B consists of 5 questions of 2 marks each.

21. Prove that two lines perpendicular to the same line are parallel to each other.

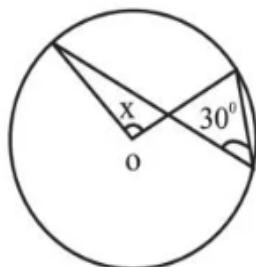
22. In the given figure $AX = AY$, $AB = AC$, show that $BX = BY$



OR

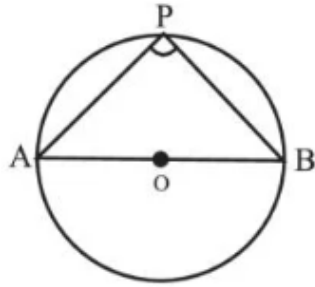
Write Euclid's first postulate.

23. Find the value of x in the given figure.



OR

In the given figure AOB is the diameter of circle with centre O and P is any point on the circle. Find $\angle APB$.



24

A hemispherical tank has inner radius of 2.8 m. find its capacity in litres.



25. An isosceles triangle has perimeter 30cm and each of the equal side is 12cm. Find the area of the triangle.

SECTION- C

Section –C consists of 6 questions of 3 marks each.

26 If $32^{2x-1} = 4 \times 8^{x-5}$ then find the value of x.

OR

Evaluate $\frac{2^{38} + 2^{37} + 2^{36}}{2^{39} + 2^{38} + 2^{37}}$

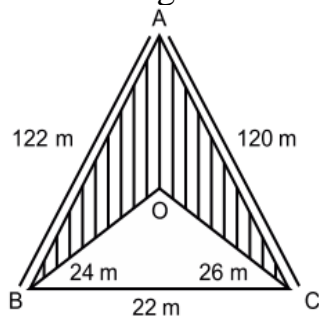
27. If the polynomial $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $(x-3)$, find the value of a.

OR

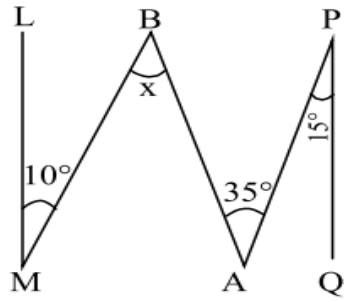
If $x = \frac{4}{3}$ is a root of the polynomial $f(x) = 6x^3 - 11x^2 + kx - 20$, find the value of k.

28. If the total number of legs in a herd of deer and crane is 40. Represent this situation in the form of linear equation in two variables.

29. Find the area of the shaded region in the figure.



30. In the given figure $QP \parallel ML$ find the value of $\angle x$.



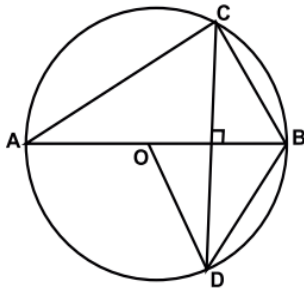
31. Find the three solutions for each of the following equations: $x + 6y = 12$

SECTION -D

Section – D consists of 4 questions of 5 marks each.

32. If $a + b + c = 0$, then find the value of $\frac{(b+c)^2}{bc} + \frac{(a+c)^2}{ac} + \frac{(a+b)^2}{ab}$

33. In the figure O is the centre of the circle, $BD = OD$ and $CD \perp AD$, Find $\angle CAB$



OR

AC and BD are chords of a circle that bisect each other. Prove that

- i) AC and BD are diameters.
- ii) ABCD is a rectangle.

34. 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 height 1m. If the outer side of each of the cone is to be painted and the cost of painting is 12 per m^2 . What will be the cost of painting all of these cones?

OR

The diameter of the moon is approximately one-fourth the diameter of the earth. Find the ratio of their surface areas and what fraction is the volume of the moon of the volume of the earth.

35. If: $x = 9 - 4\sqrt{5}$, then find :

i) $x^2 + \frac{1}{x^2}$

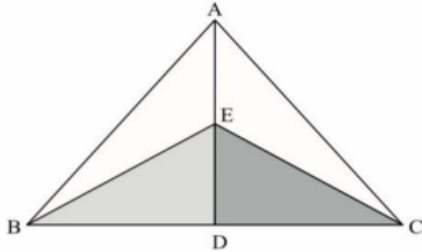
ii) $x^2 - \frac{1}{x^2}$

SECTION -E

Case study Based questions are compulsory

36. Rangoli is an art form that originates from in the Indian subcontinent, in which patterns are created on the floor or tabletop using materials such as powdered lime stone, red ochre, dry rice flour, colored sand, quartz powder, flower petals, and colored rocks.

During a Diwali festival Ananya made a geometrical Rangoli as shown below:



On measuring the dimensions, it was found that AB and AC were equal and BE and CE were also equal.

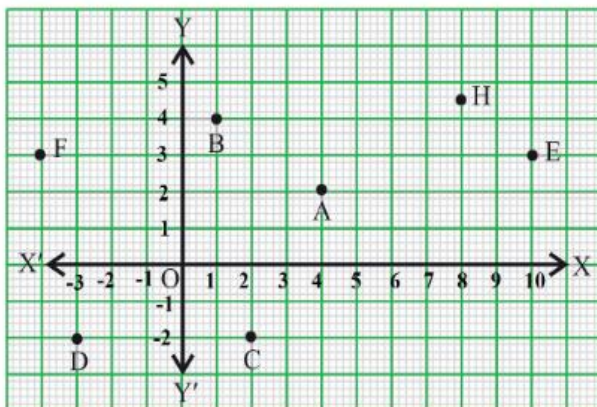
- i) Which side is common in triangles AEB and AEC? 1
- ii) Are triangles ABE and ACE congruent? 1
- iii) Show that $\angle BED = \angle CED$. 2

OR

Write the RHS Congruence Rule.

37. Sports in schools have immense benefits for both children and for educational systems. The benefits can be presented in terms of children's development in a number of domains: physical, lifestyle, affective, social, and cognitive so every school provides a playground and sport activities to the students.

Rita is a good sports person and takes part in sport activities. The positions of different students in the playground are represented by different points in Cartesian plane as shown in the graph given below:



- i) What are the co-ordinates of point B? 1
- ii) In which Quadrant does the point F lie? 1
- iii) Find the distance between the points C and D 2

OR

If a point is present on x-axis what will be its ordinate and if the point is on y-axis what will be its abscissa?

38. Small neon lamps are most widely used as visual indicators in electronic equipment and appliances, due to their low power consumption, long life, and ability to operate on mains power.



The following table gives the life times of 400 neon lamps

Life time (in hours)	Number of lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

- i) How many lamps have a life time of more than 700 hours? 1
- ii) What is class mark for the class 500 – 600? 1
- iii) While drawing the histogram for the above data life time should be taken along -----axis and number of lamps should be taken along-----axis.

2

OR

Which interval has maximum frequency and which has minimum frequency?