

Carmel Convent School
New Delhi
Annual Examination – (2023-2024)
Mathematics

Class : 1X
Dated: 23 /02/24
No of pages: 8

Total Marks : 80
Time: 3 Hours

General Instructions:

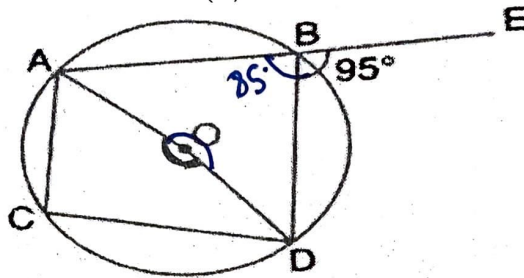
- The questions paper consists of 38 questions divided into 5 sections A, B, C, D and E.
- Section A comprises of 20 MCQs carrying 1 mark each.
- Section B comprises of 5 questions carrying 2 marks each.
- Section C comprises of 6 questions carrying 3 marks each.
- Section D comprises of 4 questions carrying 5 marks each.
- Section E has 3 case based integrated units of assessment (04 marks each) with subparts of 1, 1 and 2 marks each respectively.
- Use of calculators is not permitted.
- All the questions are compulsory.
- Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, wherever required.
- No of pages: 8
- 2 graph paper

SECTION A

Section A has 20 MCQs carrying 1 mark each. (Question number 1 to 20)

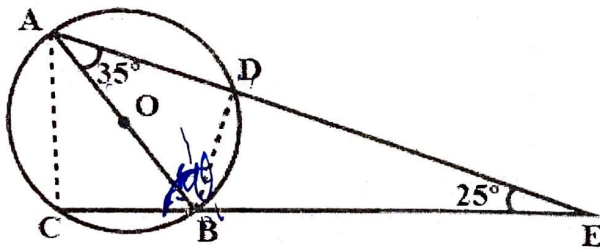
- ✓ 1. Linear equation such that each point on its graph has its ordinate equal to twice its abscissa is:
(a) $x+y=2$ (b) $y=2x$ (c) $x=2y$ (d) $x-y=2$
2. An isosceles right triangle has area 8 cm^2 . Then, the length of the hypotenuse is:
(a) $2\sqrt{2} \text{ cm}$ (b) $4\sqrt{2} \text{ cm}$ (c) $6\sqrt{2} \text{ cm}$ (d) $8\sqrt{2} \text{ cm}$
3. $x = 7 + 4\sqrt{3}$, then $\left(x + \frac{1}{x}\right) =$
(a) 10 (b) 12 (c) 14 (d) 16

4. In the given figure, O is the centre of the circle. ABE is a straight line. If $\angle DBE = 95^\circ$, then $\angle AOD$ is equal to:
- (a) 160° (b) 170°
 (c) 175° (d) 210°

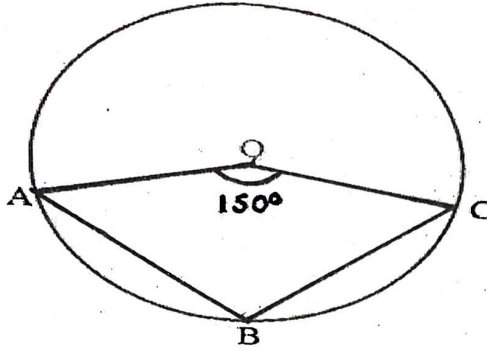


5. The radius of hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratio of the surface areas of the balloon in the two cases is :
- (a) 1 : 4 (b) 1 : 3 (c) 2 : 3 (d) 2 : 1
6. The value of the polynomial $5x - 4x^2 + 3$, when $x = -1$ is:
- (a) -6 (b) 6 (c) 2 (d) -2
7. The lateral surface area of a cone is $60\pi \text{ cm}^2$. If the slant height of the cone be 8 cm, then the diameter of the base is:
- (a) 25 cm (b) 18 cm (c) 12 cm (d) 15 cm
8. The value of k if $x=2$ and $y=1$ is a solution of the linear equation $111x - 111y = k$
- (a) 111 (b) 0 (c) 1 (d) none of the above

9. In the given figure, AB is a diameter of the circle. ADE and CBE are straight lines. If $\angle A = 35^\circ$ and $\angle E = 25^\circ$, then the measure of $\angle DBC$ is:
- (a) 115° (b) 120°
 (c) 135° (d) 145°



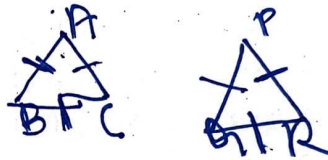
10. If a, b and c are the sides of a triangle and s = semi perimeter, then s is equal:
- (a) $\frac{a+b+c}{2}$ (b) $2(a+b+c)$ (c) $2(a-b+c)$ (d) $\frac{a+b-c}{2}$
11. In the following figure, it is given that O is the centre of the circle and $\angle AOC = 150^\circ$. Find $\angle ABC$.



- (a) 55° (b) 300° (c) 105° (d) none of the above

12. If $AB = QR$, $BC = PR$ and $CA = PQ$, then:

- (a) $\triangle ABC \cong \triangle PQR$ (b) $\triangle CBA \cong \triangle PRQ$
 (c) $\triangle BAC \cong \triangle RPQ$ (d) $\triangle PQR \cong \triangle BCA$



13. The zero of the polynomials $\frac{8x}{3} - \frac{8}{3}$ is

- (a) 1 (b) $\frac{9}{45}$ (c) $\frac{3}{5}$ (d) none of the above

✓ 14. $0.3333\dots =$

- (a) $\frac{1}{3}$ (b) 3 (c) 1 (d) $\frac{1}{2}$

✓ 15. If the surface area of two spheres are in the ratio 25:49. The ratio of their radii =

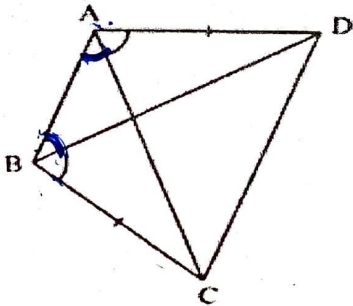
- (a) 3:7 (b) 4:7 (c) 5:7 (d) 5:9

✓ 16. Point on the graph of the equation $2x+5y=19$, whose ordinate is $\frac{3}{2}$ times its abscissa :

- (a) (3,2) (b) (2,3) (c) (-3,2) (d) (2,-3)

17. ABCD is a quadrilateral in which $AD = BC$ and $\angle DAB = \angle CBA$, then which of the following cannot be proved?

- (a) $\triangle ABD \cong \triangle BAC$ (b) $BD = AC$ (c) $\angle ABD = \angle BAC$ (d) none of the above



✓ 18. The area of an equilateral triangle with side 10 cm is

- (a) $10\sqrt{3}$ (b) $15\sqrt{3}$ (c) $20\sqrt{3}$ (d) $25\sqrt{3}$

19. DIRECTION: In the question number 19 and 20,
A statement of Assertion (A) is followed by a statement of Reason (R).
Choose the correct option

Statement A (Assertion): A parallelogram consists of two congruent triangles.

Statement R (Reason): Diagonal of a parallelogram divides it into two congruent triangles.

- (a) Both (A) and (R) are true and reason (R) is the correct explanation of assertion (A)
 (b) Both (A) and (R) are true but (R) is not a correct explanation of (A)
 (c) (A) is true but (R) is false.
 (d) (A) is false but (R) is True.
20. **Statement A (Assertion):** If $x + y = 12$ and $xy = 27$, then the value of $x^3 + y^3$ is 756.

Statement R (Reason): $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

(a) Both (A) and (R) are true and reason (R) is the correct explanation of assertion (A)

(b) Both (A) and (R) are true but (R) is not a correct explanation of (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) true

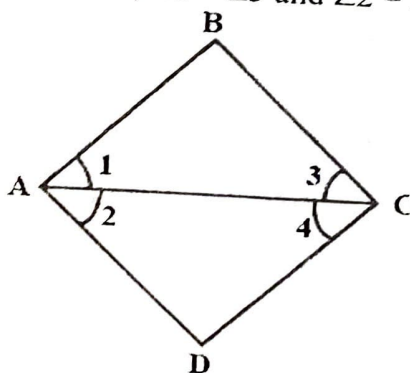
$(x^3 + y^3) = (12)(x^2 - xy + y^2)$



SECTION B

Section B has 5 questions carrying 02 marks each. (Question number 21 to 25)

21. Find all the angles of a parallelogram, if it's one angle is four-fifth of its adjacent angle.
22. The height of a cone is 16 cm and its base radius is 12 cm. Find the total surface area of the cone.
(Use $\pi = 3.14$).
23. In the adjoining figure, we have, $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$. Show that $\angle A = \angle C$.



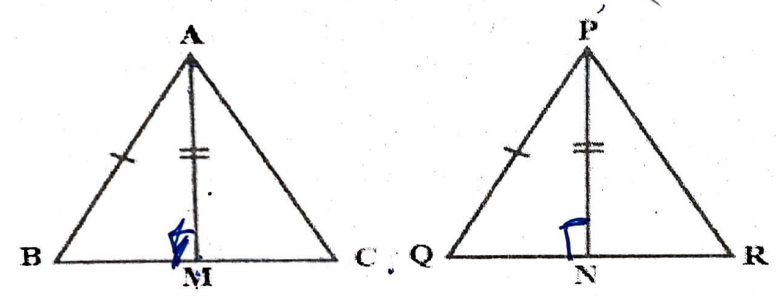
24. If circles are drawn taking two sides of a triangle as diameters, prove that the point of intersection of these circles lie on the third side.
25. Draw the graph of $y = 2x + 3$

SECTION C

Section C has 6 questions carrying 03 marks each. (Question number 26 to 31)

26. Prove that
- $$\left(\frac{x^{q+1}}{x^{p+1}}\right)^{q+p} \cdot \left(\frac{x^{r+1}}{x^{q+1}}\right)^{r+q} \cdot \left(\frac{x^{p+1}}{x^{r+1}}\right)^{p+r} = 1$$

27. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR . Show that
 (i) $\Delta ABM \cong \Delta PQN$ (ii) $\Delta ABC \cong \Delta PQR$



28. Find the area of the triangle whose perimeter is 180 cm and its two sides are 80 cm and 18 cm. Also, calculate the length of the longest altitude.
29. Draw a frequency polygon for the following data :-

Cost of living index	140 - 150	150 - 160	160 - 170	170 - 180	180 - 190	190 - 200	Total
Number of weeks	5	10	20	9	6	2	52

30. (i) Write a linear equation in two variables whose solutions is $x = 2$ and $y = 2$.
 (ii) Find the value of m , so that $(2, -5)$ satisfies the equation $4x + my = 22$.
 (iii) Show that $(4, 0)$ as well as $(6, 1)$ is a solution of $x - 2y = 4$.

31. Factorise: (a) $12x^2 - 7x + 1$ (b) $a^3 - 2\sqrt{2}b^3$

SECTION D

Section D has 4 questions carrying 05 marks each. (Question number 32 to 35)

✓ 32. ✓ (i) Expand $(4a-2b-c)^2$

* ✓ (ii) Evaluate $(999)^3$ using suitable identity.

✓ 33. Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle. ✓

✓ 34. ✓ (i) Without calculating the cubes, find the values of each of the following:

$$(28)^3 + (-15)^3 + (-13)^3$$

✓ (ii) Factorise $x^3 - 3x^2 - x + 3$

* ✓ 35. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then find the value of $x^2 + y^2$

SECTION E

Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.

✓ 36. When two or more objects match precisely with each other, then the objects are said to be congruent.

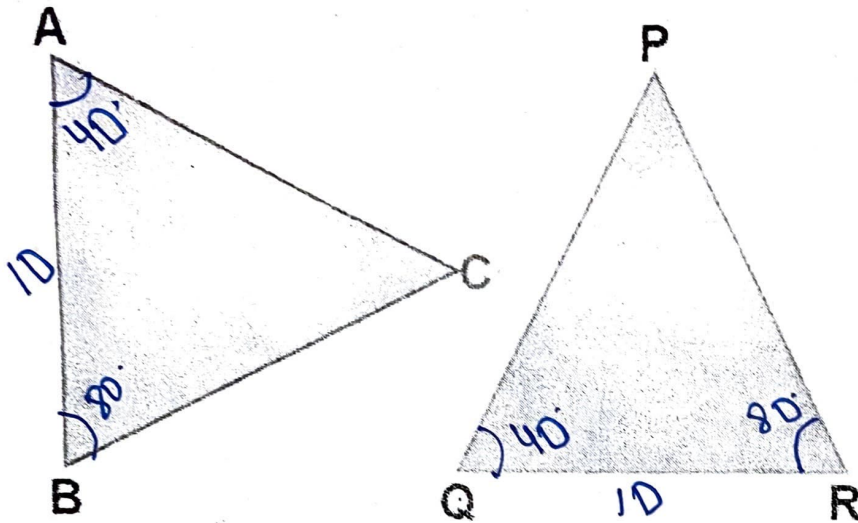
Let us see some day-to-day life congruence:

1. Biscuits of the same pack.
2. Pages in the textbook.
3. Pair of postal stamps of same denominations.
4. Two coins of the same dimension and same value.

To know that two figures are congruent to each other, one can use the superposition principle. In this method, one can obtain the trace-figure of one of the objects and place the trace-figure on the other object. If the trace-figure and the object match with each other, then the two objects are said to be congruent to each other.

The sheet containing the trace-figure can be rotated until it matches the other object. But it cannot be cut or bent to match with the other object.

Antonia has two toys in the shape of two triangles as follows:



Toy1: $\triangle ABC$ Dimensions are $AB = 10\text{cm}$, $\angle ABC = 80^\circ$, $\angle BAC = 40^\circ$

Toy2: $\triangle PQR$ Dimensions are $QR = 10\text{cm}$, $\angle PRQ = 80^\circ$, $\angle RQP = 40^\circ$

(i) Prove that the two toys are congruent. (2)

(ii) By CPCT which of the following will be true?

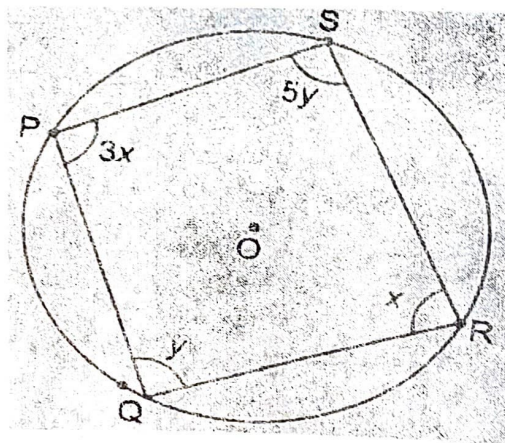
(a) $BC = QR$ (b) $AB = PQ$ (c) $AC = PQ$ (d) $\angle A = \angle P$ (1)

(iii) By CPCT measure of $\angle C$ will be equal to

(a) $\angle P$ (b) $\angle Q$ (c) $\angle R$ (d) none of these (1)

37.

In a residential colony, there was one circular ground, RWA members decided that there should be a skating area available in circular ground so that the children have opportunity to excel themselves in skating. For that purpose they chose four points P, Q, R and S and fenced the area as shown in figure .



Now answer the following questions:

- (i) What is the measure $\angle x$? (1)
- (ii) What is the measure $\angle P$? (1)
- (iii) What is the measure $\angle S$? (2)

38.

Mr. Ramanujam, a Mathematics teacher brings some green coloured clay in the classroom to teach the topic 'mensuration'. First, he forms a cylinder of radius 6 cm and height 8 cm with the clay. Then, he moulds that cylinder into a sphere similarly, he moulds the sphere in other different shapes.



Based on the above information, answer the following questions:

- (i) Find the total surface area of cylinder? (1)
- (ii) Find the volume of cylinder? (1)
- (iii) Find the radius of the sphere thus formed. (2)

..... THE END