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**ST. MARY'S CONVENT SR. SEC. SCHOOL, FARIDABAD**  
**ANNUAL EXAM (2024 – 2025)**

**Grade: IX**

**Subject: Maths (Set - 1)**

**Time Allowed: 3 Hrs**

**Maximum Marks: 80**

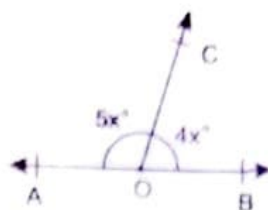
**General Instructions:**

- (i) This Question Paper has 5 Sections A-E.
- (ii) Section A has 20 MCQs carrying 0.5 mark each
- (iii) Section B has 6 questions carrying 02 marks each.
- (iv) Section C has 7 questions carrying 03 marks each.
- (v) Section D has 5 questions carrying 05 marks each.
- (vi) Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

**SECTION A**

1.  $14\sqrt{112} \div 28\sqrt{7}$  in its simplified form is equal to  
(a) 2                      (b)  $\frac{1}{2}$                       (c) 8                      (d)  $\frac{1}{8}$
2. The value of  $(9)^{0.06} \times (9)^{0.44}$  is  
(a) 3                      (b) 81                      (c) 9.9                      (d) 729
3. Which of the following is a polynomial?  
(a)  $\sqrt{5} + x^{-4}$                       (b)  $7/x$                       (c)  $7\sqrt{3} + x^2$                       (d)  $-4\sqrt{x}$
4. The factors of  $x^2 + y^2 + 2(xy + yz + zx)$  are  
(a)  $(y + z)(z + x + 2y)$                       (b)  $(x + y)(x + y + 2z)$   
(c)  $(z + x)(x + y + 2z)$                       (d)  $(y + x)(y + z + 2x)$
5. Which of the following is the equation of the line parallel to y – axis?  
(a)  $x = 7$                       (b)  $x = y$                       (c)  $x + y = 3$                       (d)  $y = 11$
6. "If equals are added to equals, the whole are equal." According to Euclid, this statement:  
a) Postulate                      b) Definition                      c) Theorem                      d) Axiom
7. The semi – perimeter of a triangle if  $(s - a) = 8$  cm,  $(s - b) = 12$  cm and  $(s - c) = 14$  cm is  
a) 17 cm                      b) 34 cm                      c) 20 cm                      d) 26 cm

8. In the given figure, the value of angle  $x$  is

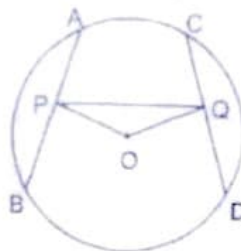


- a)  $80^\circ$                       b)  $30^\circ$                       c)  $20^\circ$                       d)  $100^\circ$

9. If  $P(-1, 1)$ ,  $Q(3, -4)$ ,  $R(1, -1)$ ,  $S(-2, -3)$  and  $T(-4, 4)$  are plotted on the graph paper, then the points in the fourth quadrant are:

- a) P and T                      b) Q and R                      c) Only S                      d) P and R

10. In figure AB and CD are two equal chords of a circle with centre O. OP and OQ are perpendiculars on chords AB and CD respectively. If  $\angle POQ = 140^\circ$ , then  $(\angle APQ + \angle CQP)$  is equal to:



- a)  $120^\circ$                       b)  $130^\circ$                       c)  $140^\circ$                       d)  $150^\circ$

11. Coordinates the point on the graph of the linear equation  $2x + 5y = 19$ , whose ordinate  $3/2$  times its abscissa is

- (a) (3, 2)                      (b) (2, 3)                      (c)  $(2, 5/2)$                       (d)  $(5/2, 2)$

12. The measure of an angle which is  $32^\circ$  less than its supplement is

- (a)  $148^\circ$                       (b)  $58^\circ$                       (c)  $74^\circ$                       (d)  $122^\circ$

13. In triangles ABC and DEF,  $\angle A = \angle D$ ,  $\angle B = \angle E$  and  $AB = EF$ , then are the two triangles congruent? If yes, by which congruency criterion?

- (a) yes by AAS                      (b) yes by ASA                      (c) no                      (d) yes by RHS

14. In rhombus PQRS,  $PQ = 3x$  cm,  $QR = 2(x + 3)$  cm. Each side of the rhombus

- (a) 17 cm                      (b) 19 cm                      (c) 18 cm                      (d) 28 cm

15. P is the mid-point of side BC of a parallelogram ABCD such that  $\angle BAP = \angle DAP$ . If AD = 10 cm, then length of CD is

- (a) 10 cm                      (b) 5 cm                      (c) 6 cm                      (d) 8 cm

16. A cone and a hemisphere of same radius 'r' have equal volumes. The height of the cone is

- (a)  $2r$                       (b)  $3r$                       (c)  $r/2$                       (d)  $r$

17. Number of circles that can be drawn through three non-collinear points is

- (a) 1                      (b) 0                      (c) 2                      (d) 3

18. If the perimeter of an equilateral triangle is 24 m, then its area is

(a)  $20\sqrt{3} \text{ m}^2$

(b)  $16\sqrt{3} \text{ m}^2$

(c)  $8\sqrt{3} \text{ m}^2$

(d)  $24\sqrt{3} \text{ m}^2$

Answer the following Assertion & Reason by using below options:

19. Assertion (A): Median of the values 2, 4, 6, 8, 10 and 12 is 9

Reason (R): Median =  $\frac{\left(\left(\frac{n}{2}\right)^{\text{th}} \text{ observation} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ observation}\right)}{2}$ , if  $n$  is even

20. Assertion (A): The height of a cone having radius 6 cm and slant height 10 cm is 12 cm.

Reason (R): The height, radius and slant height of a right circular cone forms a right angled triangle.

a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

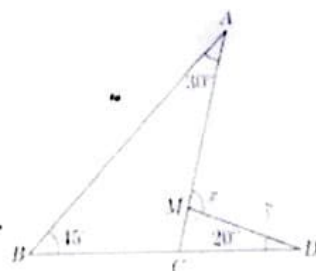
c.) assertion is true but the reason is false.

d.) assertion is false and reason is true.

### SECTION B

21. Find the point of the graph of the equation  $2x + 3y = 6$  cuts on x - axis and y-axis.

22. In the given figure, find the value of x.



OR

Prove that equal chords subtend equal angles at the centre.

23. If  $y = -1$  is a zero of the polynomial  $q(y) = 4y^3 + ky^2 - y - 1$ , then find the value of k.

OR

Without actually calculating the cubes, find the value of  $75^3 - 25^3 - 50^3$

24. A shopkeeper has one spherical laddoo of radius 5cm. With the same amount of material, how many laddoos of radius 2.5 cm can be made?

25. In the figure, we have  $\angle ABC = \angle ACB$ ,  $\angle 3 = \angle 4$ . Show that  $\angle 1 = \angle 2$ .



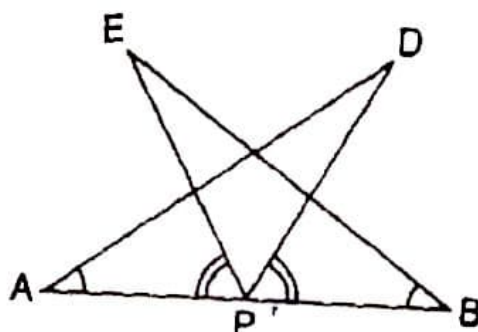


26. Find the area of an isosceles triangle having unequal side as 12 cm and each of the equal sides as 24 cm.

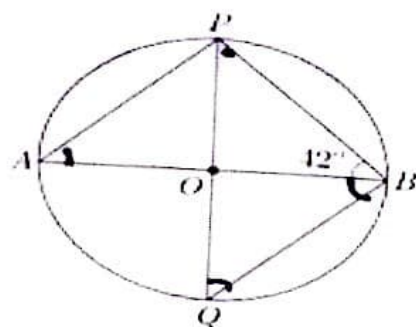
### SECTION C

27. If  $\frac{5 + \sqrt{11}}{3 - 2\sqrt{11}} = x + y\sqrt{11}$ , find the values of  $x$  and  $y$ .

28.  $AB$  is a line segment, and  $P$  is its mid-point.  $D$  and  $E$  are points on the same side of  $AB$  such that  $\angle BAD = \angle ABE$  and  $\angle EPA = \angle DPB$  (see figure). Show that (i)  $\triangle DAP \cong \triangle EBP$   
(ii)  $AD = BE$



29. The polynomials  $x^3 + 2x^2 - 5ax - 7$  and  $x^3 + ax^2 - 12x + 6$  when divided by  $x + 1$  and  $x - 2$ , leave same remainders  $R_1$  and  $R_2$  respectively. Find the value of  $a$ .
30. In the following figure, find the measure of  $\angle PQB$ ,  $\angle PAB$  and  $\angle PBQ$ , where  $O$  is the centre of the circle.



31. A hemispherical bowl of internal radius 9 cm contains a liquid. This liquid is to be filled into cylindrical shaped small bottles of diameter 3 cm and height 4 cm. How many bottles are required to empty the bowl?

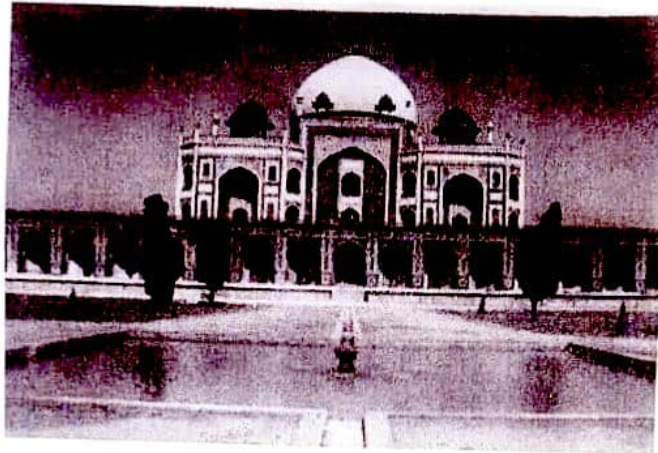
OR

- The sides of a triangle are in the ratio 3:5:7 and its perimeter is 300 m. Find its area.

32. Plot the following points and write the name of the figure obtained by joining them in order:  $P(-3, 2)$ ,  $Q(-7, -3)$ ,  $R(6, -3)$ ,  $S(2, 2)$ . Also find its area.

33. The following observations have been arranged in ascending order. If the median of the data is 63, find the value of  $x$ .  
29, 32, 48, 50,  $x$ ,  $x + 2$ , 72, 78, 84, 95

plan, based on the description of Islamic paradise gardens, is known to have inspired the Taj Mahal.



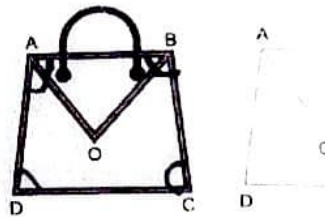
1. The formula to calculate the curved surface area of the hemispherical dome is \_\_\_\_\_.
2. The surface area of the small dome (without base) is found to be 308 sq m, find its radius.
3. Find the volume of each small dome.

OR

Find the total surface area of the hemispherical small dome.

41. Sneha is carrying a handbag in the picture. It is quadrilateral in shape. Its flap is triangular in shape. The sketch of her purse describes how the design was created by the designer.

ABCD is the body of the handbag. AO and BO are the angle bisectors of  $\angle A$  and  $\angle B$  forming the two edges of the triangular flap of the handbag.



Refer the description of the purse to answer the following questions:

- (i) Express  $\angle AOB$  in terms of  $\angle C$  and  $\angle D$ .
- (ii) If the angles of a quadrilaterals ABCD are in the ratio 3:5:9:13, find all the angles of quadrilateral ABCD.
- (iii) If  $\angle C = \angle D = 70^\circ$ , then find  $\angle AOB$

OR

If the body of the handbag is a parallelogram ABCD and the bisectors of  $\angle A$  and  $\angle B$  form the flap of the bag, Find the  $\angle AOB$ .

### SECTION D

34. (a) If  $a + b + c = 3$ ,  $a^2 + b^2 + c^2 = 5$  and  $a^3 + b^3 + c^3 = 9$  find the value of  $abc$ .

(b) Factorise:  $27 - 125a^3 - 135a + 225a^2$

35. State and Prove Degree Measure Theorem.

OR

AB and CD are two parallel chords of a circle (lying on the opposite sides of the centre) such that  $AB = 10$  cm,  $CD = 24$  cm. If the distance between AB and CD is 17 cm, determine the radius of the Circle.

36. Draw a histogram and a frequency polygon for the following data :

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	8	12	15	9	6

OR

If the mean of the following data is 20, find the value of  $m$ .

$x_i$	15	17	19	$20 + m$	23
$f_i$	2	3	4	$5m$	6

37. Simplify :

$$\frac{1}{1 + \sqrt{2}} + \frac{1}{\sqrt{2} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{4}} + \dots + \frac{1}{\sqrt{8} + \sqrt{9}}$$

38. Draw the graph of the equation  $2(x + 3) - 3(1 + y) = 0$ . Also find the point where the line meets x-axis.

### SECTION E

39. AB International School has organised a racing event for students of class IX. The students run for a distance of  $x$  metres. Raunak is the winner of the event. He finished the race in 2 minutes. If his speed is represented by ' $y$ ' m/minute.

Based on this information, answer the following questions:

- Write a linear equation in standard form.
- If the speed is 300 m/minute, then how much the distance covered.
- Write the two solutions of the equation.

OR

Express  $y$  in term of  $x$  from the above linear equation. Check whether (40,20) and (30,60) are the solutions of the equation or not.

40. In the classical Mughal Char bagh pattern. A high wall surrounds the garden on three sides. The garden is divided into four parts by two bisecting water channels with paved walkways (khiyabans), which terminate at two gates. Its