

INTERNATIONAL INDIAN SCHOOL DAMMAM

GSS

ANNUAL - PRACTICE PAPER

CLASS X 2023-24

SUBJECT: MATHEMATICS

COORDINATE GEOMETRY

1. The coordinates of the point which divides the line segment joining the points (-1,7) and (4, -3) in the ratio 2:3 internally is ____.
2. If the point P (2,1) lies on the line segment joining A(4,2) and B(8,4) then
(a) $AP = \frac{1}{3} AB$ (b) $AP = PB$ (c) $PB = \frac{1}{3} AB$ (d) $AP = \frac{1}{2} AB$
3. If the distance of P(x ,y) from A(6, 2), and B(-2, 6) are equal, then
(a) $x = 2y$ (b) $y = 2x$ (c) $y = 3x$ (d) $x = 3y$
4. The point (a/8, 4) is the midpoint of the line joining the points A(-5,2) and B (4,6), the value of 'a' is _____.
5. Determine the ratio in which the line $3x+y-9=0$ divides the line segment joining the points (1,3) and (2,7).
6. What is the ratio in which the y -axis divides the line segment joining the points (-1, - 4) and (5,- 6) ?
7. Let P and Q be the points of trisection of the line segment joining the points A(2,- 2) and B(-7,4) such that P is nearer to A. Find the coordinates of P and Q.
8. If the point P(k,0) divides the line segment joining the points A (2,-2) and B(-7,4) in the ratio 1:2, the find the value of 'k'.
9. Find the coordinates of a point which lies on the perpendicular bisector of the line segment joining the points (-2,-5)and B(2, 5)

10. If $x - 2y + k = 0$ is a median of the triangle whose vertices are at points A(-1, 3) B(0, 4) and C(-5, 2) then the value of k is ___.

TRIGONOMETRY

1. The value of $(\sin 30^\circ + \cos 30^\circ) - (\sin 60^\circ + \cos 60^\circ)$ is
 (a) -1 (b) 0 (c) 1 (d) 2
 2. The value of $\frac{\tan 30^\circ}{\cot 60^\circ}$ is
 (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) 1
 3. The value of $(\sin 45^\circ + \cos 45^\circ)$ is
 (a) $\frac{1}{\sqrt{2}}$ (b) $\sqrt{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1
 4. If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A$ is
 (a) -1 (b) 0 (c) 1 (d) 2
 5. If $6\cot\theta + 2\operatorname{cosec}\theta = \cot\theta + 5\operatorname{cosec}\theta$, then $\cos\theta$ is
 (a) $\frac{4}{5}$ (b) $\frac{5}{3}$ (c) $\frac{3}{5}$ (d) $\frac{5}{4}$
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Assertion & Reason

1. **Assertion:** If $x = 2 \sin^2\theta$ and $y = 2 \cos^2\theta + 1$ then the value of $x + y = 3$.
Reason : For any value of θ , $\sin^2\theta + \cos^2\theta = 1$
2. **Assertion:** Sin A is the product of Sin and A.
Reason : The value of $\sin\theta$ increases as θ increases.
3. **Assertion:** $(\cos^4 A - \sin^4 A)$ is equal to $2\cos^2 A - 1$.
Reason : The value of $\cos\theta$ decreases as θ increases.

Subjective Questions

1. If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{1}{\sqrt{2}}$, then find A and B.
2. If $\sin \theta = \cos \theta$, find the value of $2 \tan 2\theta + \sin 2\theta - 1$

- If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, then prove that $m^2 - n^2 = 4 \sqrt{mn}$
- In $\triangle OPQ$ right angled at P, $OP = 7\text{cm}$ and $OQ - PQ = 1\text{ cm}$. Determine the values of $\sin Q$ and $\cos Q$

STATISTICS

- If the mean of 5 observations $x, x+2, x+4, x+6$ and $x+8$ is 11, then find the value of x .
- The mean and mode of a data are 24 and 12 respectively. Find the median.
- Find the sum of lower limits of median class and modal class for the following distribution.

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

4.

Write the following data into less than cumulative frequency distribution table.

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	7	9	6	8	10

In the formula $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$, finding the mean of the grouped data, d_i 's are deviations from assumed mean 'a' of

- (a) lower limits of classes
 - (b) upper limits of classes
 - (c) class marks
 - (d) frequencies of the classes.
5.
6.

The following table shows the cumulative frequency distribution of marks of 800 students in an examination:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80	Below 90	Below 100
No. of Students	8	17	32	62	80	80	80	80	80	80

Find the mean marks.

7.

Assertion: The arithmetic mean of the following given frequency distribution table is 13.81.

x	4	7	10	13	16	19
f	7	10	15	20	25	30

Reason: $\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$

- (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 correct but reason is wrong.
 (d) Assertion is incorrect but reason is correct.

SOME APPLICATIONS OF TRIGONOMETRY

1. If the length of the shadow of a tree is decreasing then the angle of elevation is:

- (a) Increasing (b) Decreasing (c) Remains the same (d) None of the above

2. The angle of elevation of the top of a building from a point on the ground, which is 30 m away from the foot of the building, is 30° . The height of the building is:

- (a) 10 m (b) $30/\sqrt{3}$ m (c) $\sqrt{3}/10$ m (d) 30 m

3. If a tower 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the sun's elevation is:

- (a) 60° (b) 45° (c) 30° (d) 90°

4. Assertion: The angle of elevation of an object viewed, is the angle formed by the line of sight with the horizontal when it is above the horizontal level.

Reason: The angle of depression of an object viewed, is the angle formed by the line of sight with the horizontal when it is below the horizontal level.

- 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.

5. Assertion: If the length of shadow of a vertical pole is equal to its height, then the angle of elevation of the sun is 45°

Reason : According to Pythagoras Theorem, $h^2 = l^2 + b^2$, where h = hypotenuse, l = length and b = base

- 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.

6. A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5m away from the wall, find the length of the ladder.

7. A tree breaks due to a storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with the ground. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

TRIANGLES

Mark the correct alternative in each of the following :

1. D and E are respectively the points on the sides AB and AC of a $\triangle ABC$ and $DE \parallel BC$, such that $AD = 3$ cm, $AB = 12$ cm, $AE = 4$ cm, then the value of CE is :

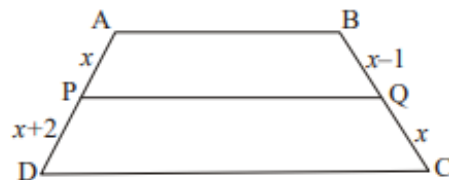
(a) 6 cm

(b) 9 cm

(c) 12 cm

(d) 15 cm

2. In the given figure, $PQ \parallel DC \parallel AB$. The value of x is :



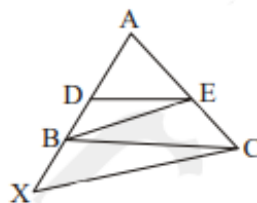
(a) 1

(b) 2

(c) 3

(d) 4

3. In the given figure, $DE \parallel BC$, $BE \parallel XC$ and $\frac{AD}{DB} = \frac{2}{1}$, then the value of $\frac{AX}{XB}$ is:



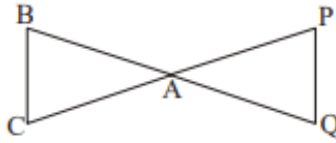
(a) 2 : 1

(b) 3 : 1

(c) 3 : 2

(d) none of these

5. In the given figure, $\Delta ACB \sim \Delta APQ$. If $BC = 8$ cm, $PQ = 4$ cm, $BA = 6.5$ cm, $AP = 2.8$ cm, the value of AC is:



- (a) 5.6 cm (b) 2.8 cm (c) 8 cm (d) none of these
6. A vertical stick 12 m long casts a shadow 8 m long on the ground. At the same time a tower casts the shadow 40 m long on the ground. The height of the tower is :
- (a) 50 m (b) 60 m (c) 80 m (d) none of these
7. The perimeters of two similar triangles ABC and PQR are respectively 36 cm and 24 cm. If $PQ = 8$ cm, then the value of AB is :
- (a) 12 cm (b) 15 cm (c) 18 cm (d) none of these

8. If in two triangles ABC and DEF $\frac{AB}{DF} = \frac{BC}{FE} = \frac{CA}{ED}$, then

- (a) $\Delta ABC \sim \Delta DEF$ (b) $\Delta ABC \sim \Delta EDF$ (c) $\Delta ABC \sim \Delta EFD$ (d) $\Delta ABC \sim \Delta DFE$

9.

A street light bulb is fixed on a pole 6 m above the level of the street. If a woman of height 1.5 m casts a shadow of 3 m, find how far she is away from the base of the pole.

- (a) 12 m (b) 10 m (c) 9 m (d) 11 m

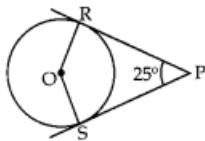
10.

If $\Delta ABC \sim \Delta DEF$, $AB = 4$ cm, $DE = 6$ cm. $EF = 9$ cm and $FD = 12$ cm, find the perimeter of ΔABC .

- (a) 12 cm (b) 14 cm (c) 16 cm (d) 18 cm

CIRCLES

1. In the given figure, if $\angle ZRPS = 25^\circ$, the value of $\angle ROS$ is



- (a) 135° (b) 145° (c) 165° (d) 155°

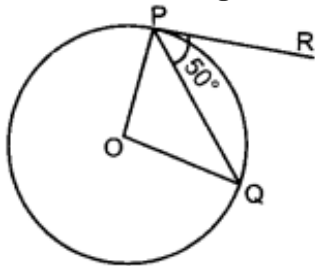
2. The length of a tangent drawn from a point at a distance of 10 cm of circle is 8 cm. The radius of the circle is

- (a) 4 cm (b) 5 cm (c) 6 cm (d) 7 cm

3. In figure AT is a tangent to the circle with centre O such that $OT = 4$ cm and $\angle OTA = 30^\circ$. Then AT is equal to

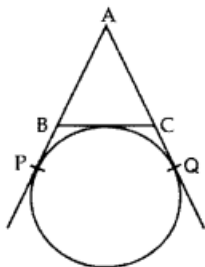
- (a) 4 cm (b) 2 cm (c) 23 cm (d) 43 cm

4. In figure if O is centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, then $\angle POQ$ is equal to



- (a) 100° (b) 80° (c) 90 (d) 75°

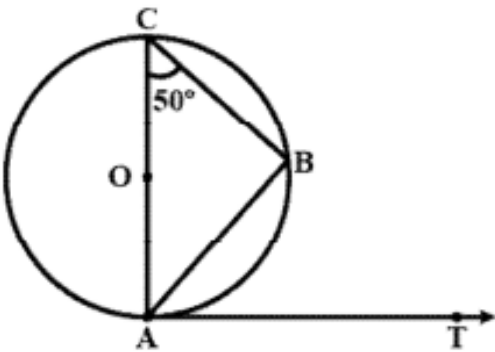
5. In the given figure, AP, AQ and BC are tangents to the circle. If $AB = 5$ cm, $AC = 6$ cm and $BC = 4$ cm, then calculate the length of AP (in cm).



- (a) 7cm (b) 3.5cm (c) 7.5cm

6. Prove that the lengths of the tangents drawn from an external point to a circle are equal

7. Prove that the tangent to a circle is perpendicular to the radius through the point of contact.
8. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.
9. In the below figure, AB is a chord of the circle and AOC is its diameter such that $\angle ACB = 50^\circ$. If AT is the tangent to the circle at the point A, then find $\angle BAT$.



SURFACE AREAS AND VOLUMES

The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3.

Ratio of their volumes is

- | | |
|------------|----------|
| a) 27 : 20 | c) 9 : 4 |
| b) 20 : 27 | d) 4 : 9 |
-

The ratio of the total surface area of a solid hemisphere to the square of its radius is

- | | |
|---------------|---------------|
| a) $2\pi : 1$ | c) $4\pi : 1$ |
| b) $3\pi : 1$ | d) $1 : 4\pi$ |
-

11. A copper wire 3mm in diameter is wound about a cylinder whose length is 1.2m, and diameter 10cm , so as to cover the curved surface of the cylinder . Find the length and the mass of the wire, assuming the density of the the Copper wire to be 8.88gram per cm

12. A toy is in the form of a cone mounted on a hemi-sphere of same radius. The diameter of the base of the conical part is 7cm and the total height of the toy is 14.5cm. find the volume of the toy.

13. A circus tent is in the form of a right circular cylinder with right circular cone above it.

i. The diameter and the height of the cylindrical part of the tent are 126m and 12m respectively.

ii. The total height of the tent is 28m.

Find the total cost of the tent if the canvas used costs Rs.30 per sq.m.