



CHENNAI SAHODAYA SCHOOL COMPLEX
COMMON EXAMINATION
CLASS 10- SET 2
MATHEMATICS STANDARD (041)

Roll No:

Date: 03/01/2025

Max Marks : 80

Max Time : 3 hr

General Instructions:

- * Check that this question paper contains 07 printed pages
- * Check that this question paper contains 38 questions
- * Write down the serial number of the question before attempting it
- * Reading time of 15 minutes is given to read the question paper. No writing is permitted during this time

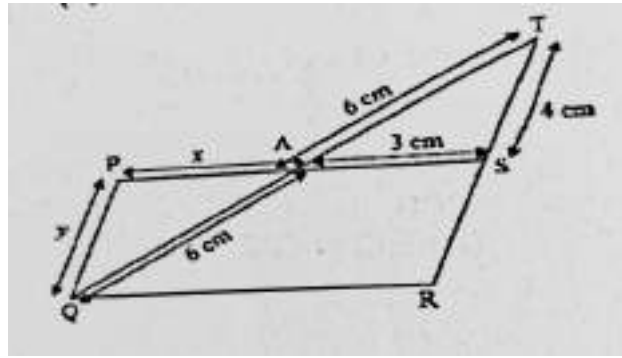
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 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 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 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION A

1. If α and β are the zeros of the polynomial $x^2 - 6x + k$ and $3\alpha + 2\beta = 20$, then the value of k is
a) - 8 b) 16 c) - 16 d) 8
2. The ratio of LCM and HCF of the least composite number and the least prime number is
a) 1 : 2 b) 2 : 1 c) 1 : 1 d) 1 : 3
3. If 7 times the 7th term of an AP is equal to 11 times its 11th term, then its 18th term will be
a) 11 b) 7 c) 18 d) 0
4. Which of the following is not a quadratic equation ?
a) $3(x+1)^2 = 2x^2 + x + 4$ b) $5x + 2x^2 = x^2 + 9$
c) $(x^2 - 2x)^2 = x^4 + 3 + 4x^2$ d) $(\sqrt{2}x + \sqrt{3})^2 = 2x^2 - 3x$
5. The distance between the points ($a \cos 25^\circ$, 0) and (0 , $a \sin 25^\circ$) is

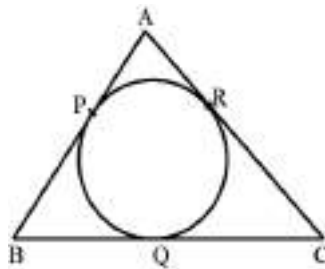
- a) a^2 b) a c) 0 d) $\cos^2 25^\circ + \sin^2 25^\circ$

6. In the fig, PQRS is a parallelogram, if $AT = AQ = 6$ cm, $AS = 3$ cm and $TS = 4$ cm, then



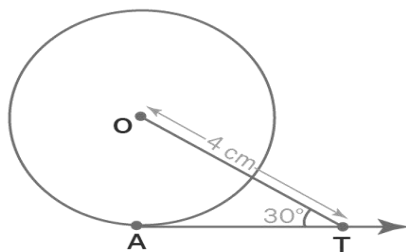
- a) $x = 4, y = 5$ b) $x = 2, y = 3$ c) $x = 1, y = 2$ d) $x = 3, y = 4$

7. In the fig, $AB = BC = 10$ cm. If $AC = 7$ cm, then the length of BP is



- a) 3.5 cm b) 7 cm c) 6.5 cm d) 5 cm

8. In the adjoining fig, AT is tangent to the circle with centre O at A such that $OT = 4$ cm and $\angle OTA = 30^\circ$. Then AT is equal to

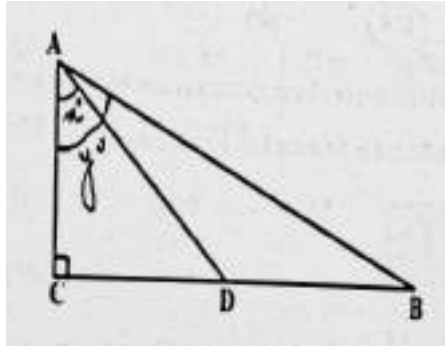


- a) 4 cm b) 2 cm c) $2\sqrt{3}$ cm d) $4\sqrt{3}$ cm

9. If the difference of mode and median of a data is 24, then the difference of median and mean is

- a) 12 b) 24 c) 8 d) 36

10. In the fig, D is the midpoint of BC, then the value of $\frac{\cot y}{\cot x}$



- a) 2 b) $\frac{1}{2}$ c) $\frac{1}{3}$ d) $\frac{3}{4}$
11. If $\tan^2 45^\circ - \cos^2 30^\circ = p \sin 45^\circ \cos 45^\circ$, then $p =$
a) 2 b) -2 c) $-\frac{1}{2}$ d) $\frac{1}{2}$
12. A ladder 14m long rests against a wall. If the foot of the ladder is 7 m from the wall, then the angle of elevation is
a) 30° b) 45° c) 60° d) 90°
13. If the perimeter of a semi circular protractor is 36 cm, then its diameter is
a) 7 cm b) 12 cm c) 14 cm d) 16 cm
14. If the area of a sector of a circle bounded by an arc of length 5π cm is equal to 20π sq cm, then the radius of the circle is
a) 12 cm b) 16 cm c) 8 cm d) 10 cm
15. If two solid hemispheres of same base radius r are joined together along their bases, then the curved surface area of the new solid is
a) $3\pi r^2$ b) $6\pi r^2$ c) $4\pi r^2$ d) $2\pi r^2$
16. The probability of getting a bad apple in a box of 400 apples is 0.035, then the total number of bad apples is
a) 7 b) 14 c) 21 d) 28
17. The probability that a number selected at random from the numbers between 12 and 28 is a multiple of 4 is
a) $\frac{5}{17}$ b) $\frac{1}{5}$ c) $\frac{3}{17}$ d) $\frac{4}{15}$
18. ΔABC is such that $AB = 3\text{cm}$, $BC = 2\text{ cm}$ and $CA = 2.5\text{ cm}$. If $\Delta DEF \sim \Delta ABC$ and $EF = 4\text{cm}$, then perimeter of ΔDEF is
a) 7.5 cm b) 15 cm c) 22.5 cm d) 30 cm
19. **Directions:**
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Assertion is incorrect but Reason is correct

Assertion: If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.

Reason: if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

20. Directions:

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

(b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Assertion is incorrect but Reason is correct

Assertion: $-5, \frac{-5}{2}, 0, \frac{5}{2}, \dots$ is in AP

Reason: The terms of an AP cannot have both positive and negative rational numbers

SECTION B

21. Solve for x and y : $49x + 51y = 499$; $51x + 49y = 501$

22. Point A(- 1, y) and B(5, 7) lie on a circle with centre O(2, -3y). Find the values of y. Hence find the radius of the circle.

23. Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find the probability that the product of numbers obtained is an odd number.

[OR]

How many positive three-digit integers have the hundredths digit 8 and unit's digit 5?

Find the probability of selecting one such number out of all three digit numbers.

24. A rectangular courtyard is 32m long and 16cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles

[OR]

Prove that $5 - \sqrt{7}$ is irrational, given that $\sqrt{7}$ is irrational

25. If $\operatorname{cosec} \theta = 2x$ and $\cot \theta = \frac{2}{x}$, find the value of $2(x^2 - \frac{1}{x^2})$

SECTION C

26. If α and β are the zeros of the quadratic polynomial $5x^2 + 5x + 1$, find the value of

$$\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\alpha\beta}$$

27. A school has five houses A,B,C,D and E. In class X, House A has 4 students, 8 from house B, 5 from house C, 2 from house D and the rest from house E. If the total number

of students in class X is 23 and if one student is chosen as class monitor, find the probability that the selected student is (i) not from A, B and C

(ii) Either from C or E

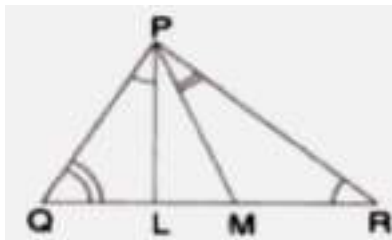
(iii) Neither from A nor D

28. If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$.

29. If one of the diagonals of a trapezium divides the other diagonal in the ratio 1: 2, prove that one of the parallel sides is twice the other

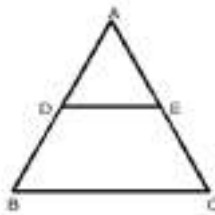
[OR]

In a triangle PQR, L and M are two points on the base QR, such that $\angle LPQ = \angle QRP$ and $\angle RPM = \angle PQR$. Prove that $PQ^2 = QR \times QL$



30. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200km/h from its usual speed and the time of the flight increased by 30 min. find the scheduled duration of the flight

31. In the given fig, D and E are the midpoints of the sides BC and AC respectively of ΔABC , where A(4 , -2) B(2, -2) and C(-6, -1) are the vertices of the triangle. Find the lengths of DE and AB and hence prove that $DE = \frac{1}{2} AB$



[OR]

The line segment joining the points (3 , -4) and (1,2) is trisected at the points P and Q.

If the coordinates of P and Q are (p, -2) and ($\frac{5}{3}$, q) respectively , find the values of p and q

SECTION D

32. The angle of depression from the top of a tower of a point A on the ground is 30° . On moving a distance of 20 metres from the point A towards the foot of the tower to a point B, the

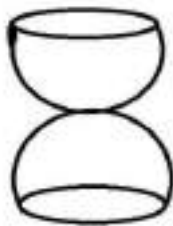
angle of elevation of the top of the tower from the point B is 60° . Find the height of the tower and its distance from the point A. (use $\sqrt{3} = 1.732$)

33. The following distribution gives the marks scored by of 40 students of a class :

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50
Number of students	9	19	27	35	40

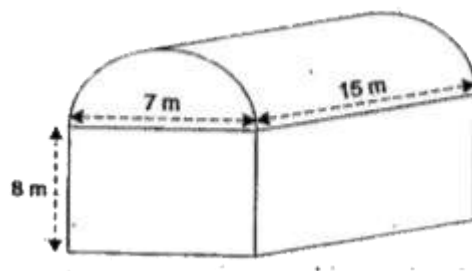
Find the median and the mode for the above distribution

34. A solid spherical ball of the metal is divided into two hemispheres and joined as shown in the fig. The solid is placed in a cylindrical tub full of water in such a way that the whole solid is submerged in water. The radius and height of cylindrical tub are 4 cm and 11 cm respectively and the radius of spherical ball is 3 cm. Find the volume of the water left in the cylindrical tub

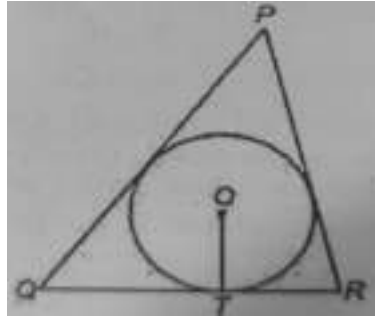


[OR]

A woman runs a small-scale industry in a shed made out of metal, which is in the shape of a cuboid surmounted by a half cylinder as shown in the figure. If the base of the shed is of dimensions 7m x 15 m and the height of the cuboidal portion is 8m, find the volume of the shed. Also find the amount of metal required to construct the shed

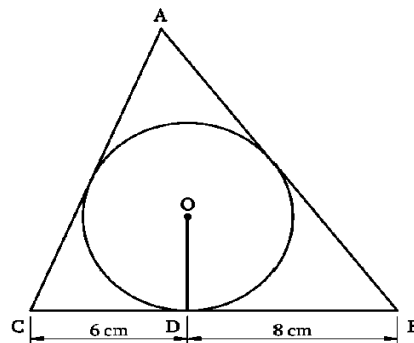


35. In the adjoining fig, a triangle PQR is drawn to circumscribe a circle of radius 6cm such that the segments QT and QR into which QR is divided by the point of contact T, are of lengths 12 cm and 9 cm respectively. If the area of ΔPQR is 189 sq cm, then find the lengths of PQ and PR



[OR]

A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the tangents BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.

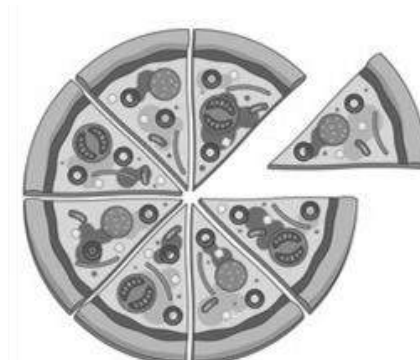


SECTION E

36. We all love to eat pizzas, especially kids. And a variety of pizzas are available in India which have been modified according to Indian taste and menu. Consider two pizzas, both of equal diameter, namely, 7 inches. The first pizza marked (I) has been cut into six equal slices, whereas the second pizza, marked (II) has been cut into eight equal slices. (use $\sqrt{3} = 1.7$)

PIZZA I

PIZZA II



Based on the above information, answer the following questions.

(i) Find the perimeter of one slice in pizza marked (1 mark).

(ii) Find the area of segment corresponding to one slice of pizza marked (I) (2 marks)

(iii) Find the ratio of areas of each sector of pizza (I) and (II). (1 mark)

[OR]

Find the ratio of the length of the arc of each sector of pizza (I) and (II)

37. A teacher ask her class student to make an irregular polygon with 31 sides, using cardboard. The student made the polygon is such a way that the lengths of which, starting from the smallest are in AP. If the perimeter of the polygon is 527 cm and the length of the largest side is sixteen times the smallest



Answer the questions based on the information

(i) Find the common difference [1 mark]

(ii) Find the length of the smallest side [1 mark]

(iii) Find the sum of the lengths of the smallest side and the largest side of the polygon

[OR]

Find the ratio of the 5th side and the 20th side [2 marks]

38. A farmer was asked to design a rectangular field whose length is 10 m less than twice its breadth and the area is 600 sq m. If the breadth of the field is 'x' metre

Answer the following questions based on the information:



- [i] Find the length of the field in terms of x (1 mark)
- [ii] Find the equation obtained (1 mark)
- [iii] Find the area of the field (2 marks)

[OR]

Find the perimeter of the field

***** End of the Paper *****