10 CLASS

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MATHEMATICS

(STANDARD & BASIC)

SURE SHOT QUESTIONS

FOR 2026 BOARD EXAMS

O.P. GUPTA

SACHIN PANDEY

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- 16 Solved Sample Papers
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- Multiple Choice Questions
- Case Study Questions
- Assertion-Reason Questions
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UMANG TEST SERIES

For CBSE 2026 Board Exams - Class 10 (Standard & Basic)

MATHEMATICS (UTS-25) SAMPLE PAPER

SURE SHOT QUESTIONS

a compilation by O.P. GUPTA (INDIRA AWARD WINNER)

General Instructions : Same as given in UTS-01.

SECTION A

*(Question numbers 01 to 20 carry **1 mark** each.)*

*Followings are **multiple choice questions**. Select the correct option in each one of them.*

01. The ratio of LCM and HCF of the least composite and the least prime numbers is
(a) 3 : 1 (b) 2 : 1 (c) 1 : 1 (d) 1 : 3

02. If one zero of $3x^2 + 8x + k$ be the reciprocal of the other, then $k =$
(a) 3 (b) -3 (c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

03. If x and y are two odd prime numbers such that $x > y$, then $x^2 - y^2$ is
(a) an even number (b) an odd number
(c) an odd prime number (d) a prime number

04. If the system of equations $2x + 3y = 7$ and $2ax + (a+b)y = 28$ has infinite many solutions, then
(a) $a = 2b$ (b) $b = 2a$ (c) $a + 2b = 0$ (d) $2a + b = 0$

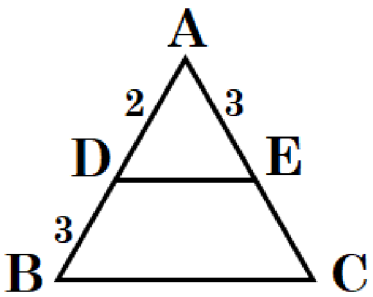
05. The relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(1, 4)$ and $B(-1, 2)$ is
(a) $x - y + 3 = 0$ (b) $x = y$ (c) $x = 2y$ (d) None of these

06. The LCM of two prime numbers p and q, $(p > q)$ is 221. Then the value of $(3p - q)$ is
(a) 4 (b) 28 (c) 38 (d) 48

07. If $\sin\theta - \cos\theta = 0$, then the value of $\sin^4\theta + \cos^4\theta$ is
(a) 1 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

08. If $3\cos\theta = 5\sin\theta$, then the value of $\tan\theta - \cot\theta$ is
(a) $\frac{16}{15}$ (b) $-\frac{16}{15}$ (c) 0 (d) $-\frac{15}{16}$

09. In the given figure, if $\angle ADE = \angle ABC$, then CE =
(a) 2
(b) 5
(c) $\frac{9}{2}$
(d) 3



All lengths are in units.

10. The shadow of a 5 m long stick is 2 m long. At the same time the length of the shadow of a 12.5 m high tree (in m) is
(a) 3 (b) 3.5 (c) 4.5 (d) 5

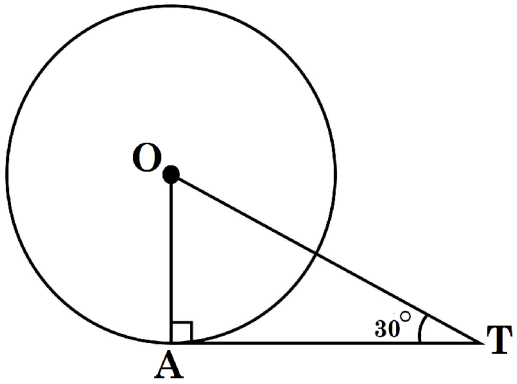
11. In the given figure, AT is a tangent to the circle with centre O such that $OT = 4$ cm and $\angle OTA = 30°$. Then AT =

(a) 4 cm

(b) 2 cm

(c) $2\sqrt{3}$ cm

(d) $4\sqrt{3}$ cm



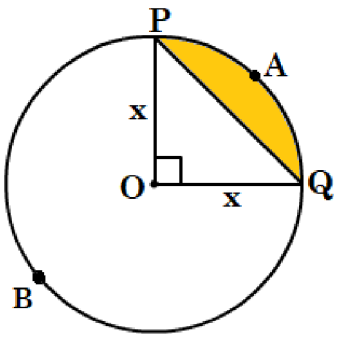
12. Area of segment PBQ (un-shaded region), is

(a) $\frac{x^2}{4}(\pi-2)$

(b) $\frac{x^2(3\pi+2)}{4}$

(c) $\frac{x^2}{4}(\pi-1)$

(d) $\frac{x^2}{4}(\pi+1)$



13. Two cubes each of edge 12 cm are joined. The surface area of new cuboid is

(a) 140 cm^2 (b) 1440 cm^2 (c) 144 cm^2 (d) 72 cm^2

14. If the difference of Mode and Median of a data is 24, then the difference of median and mean is

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

15. The perimeter (in cm) of a square circumscribing a circle of radius a cm is

(a) 4a (b) 5a (c) 8a (d) 10a

16. For the following distribution,

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

the sum of the lower limits of the median and modal class is

(a) 15 (b) 25 (c) 30 (d) 35

17. In a family of 3 children, the probability of having at least one boy is

(a) $\frac{7}{8}$ (b) $\frac{1}{8}$ (c) $\frac{5}{8}$ (d) $\frac{3}{4}$

18. For any ΔABC, the value of $\cos\left(\frac{A+B+C}{2}\right)=$

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

*Followings are **Assertion-Reason based questions.***

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

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

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

19. **Assertion (A) :** The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. is given by 162.

Reason (R) : If a and b are two positive integers, then $\text{H.C.F.} \times \text{L.C.M.} = a \times b$.

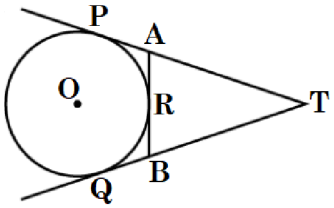
20. **Assertion (A) :** Mid-point of a line segment divides line in the ratio $1:1$.

Reason (R) : The ratio in which the point $(-3, k)$ divides the line segment joining the points $(-5, 4)$ and $(-2, 3)$ is $1:2$. Then $3k + 10 = 0$.

SECTION B

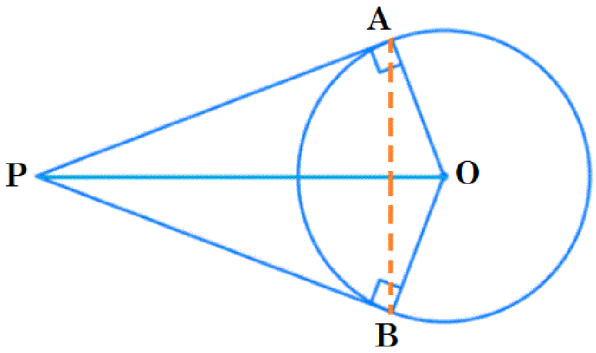
*(Question numbers 21 to 25 carry **2 marks** each.)*

21. In figure, TP and TQ are tangents from T to the circle with centre O and R is any point on the circle. If AB is any tangent to the circle at R, prove that $TA + AR = TB + BR$.



OR

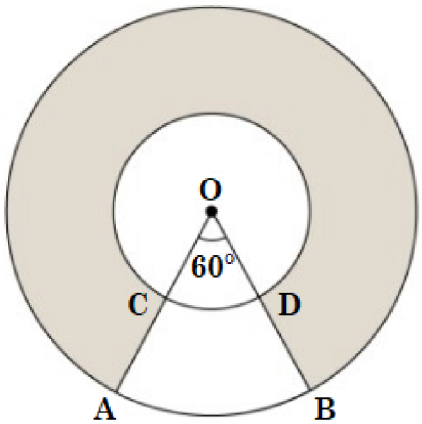
Prove that the angle between the two tangents (PA and PB) drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact and the centre i.e., $\angle APB + \angle AOB = 180^\circ$. If $\angle APB = 60^\circ$, then find $\angle AOB$.



22. Solve for x and y : $99x + 101y = 499,\ 101x + 99y = 501$.

23. If $7\sin^2\theta + 3\cos^2\theta = 4$, then find the value of $\cot\theta$.

24. In the figure, two concentric circles with center O have radii 21 cm and 42 cm.



If $\angle AOB = 60°$, then find the area of shaded region.

OR

If the perimeter of a semicircular protractor is 36 cm, find its diameter.

25. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.

SECTION C

*(Question numbers 26 to 31 carry **3 marks** each.)*

26. If α and β are the zeroes of the quadratic polynomial given by $f(x)=25x^2-15x+2$, then find a quadratic polynomial whose zeroes are $\frac{1}{2\alpha}$ and $\frac{1}{2\beta}$.

27. The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and breadth by 2 units, the area increases by 67 square units. Find the dimensions of rectangle.

OR

The students of a class are made to stand in rows. If 4 students are extra in each row, there would be 2 rows less. If 4 students are less in each row, there would be 4 rows more. Find the number of students in the class.

28. Given that $\sqrt{3}$ is irrational, hence show that $\frac{7+5\sqrt{3}}{2}$ is irrational.

29. Prove that the intercept of a tangent between a pair of parallel tangents to a circle subtend a right angle at the centre of the circle.

OR

Two tangents TP and TQ are drawn to a circle with centre O, from an external point T.
Prove that $\angle PTQ = 2\angle OPQ$.

30. Prove that $(\sec\theta-\tan\theta)^2=\frac{\operatorname{cosec}\theta-1}{\operatorname{cosec}\theta+1}$.

31. A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is
    (a) a black king
    (b) either a black card or a king
    (c) a jack, queen or a king.

SECTION D

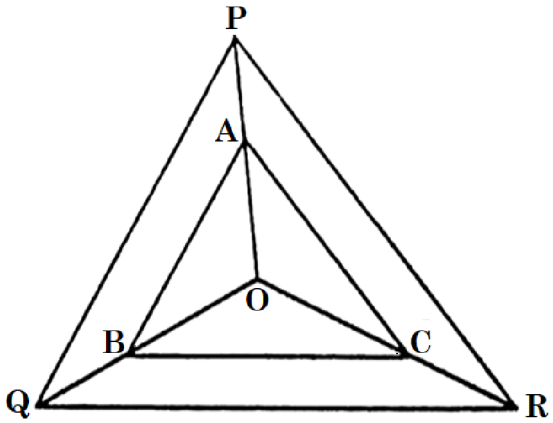
*(Question numbers 32 to 35 carry **5 marks** each.)*

32. Solve for x : $9x^2-9(a+b)x+\left[2a^2+5ab+2b^2\right]=0$.

OR

A trader bought a number of articles for ₹900. Five articles were found damaged. He sold each of the remaining articles at ₹2 more than what he paid for it. He got a profit of ₹80 on the whole transaction. Find the number of articles he bought.

33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.
In the given figure, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $BC \parallel QR$. Show that $AC \parallel PR$.



34. The height of a cone is 40 cm. A small cone is cut off at the top by a plane parallel to the base and its volume is $\frac{1}{64}$ times the volume of original cone. Find the height from the base at which the section is made.

OR

A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹500 per m^2.

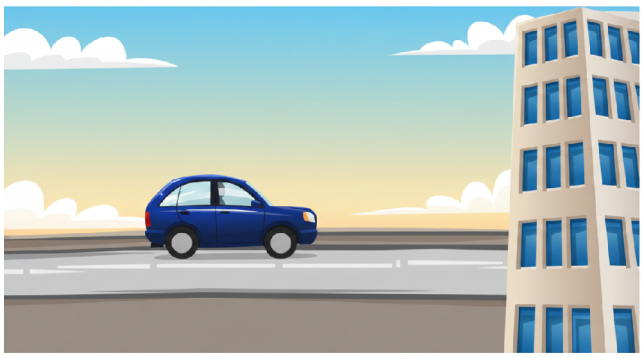
35. If the mean of the following data is 14.7, find the values of p and q.

Class	0-6	6-12	12-18	18-24	24-30	30-36	36-42	Total
Frequency	10	p	4	7	q	4	1	40

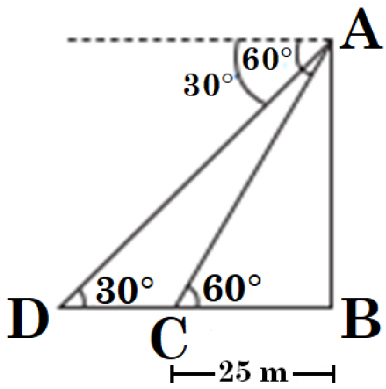
SECTION E

*(Question numbers 36 to 38 carry **4 marks** each.)*
*This section contains **three Case-study / Passage based questions**.*
*Each question has **three sub-parts** (i), (ii) and (iii). Two sub-parts are of **1 mark each** while the remaining third sub-part (with internal choice) is of **2 marks**.*

36. **CASE STUDY I :** Isha is standing at the top of the building observes a car at an angle of depression of 30°, which is approaching to the foot of the building with a uniform speed.



6 seconds later, the angle of depression of the car is found to be 60°, and its distance at that instant from the building is 25 m.



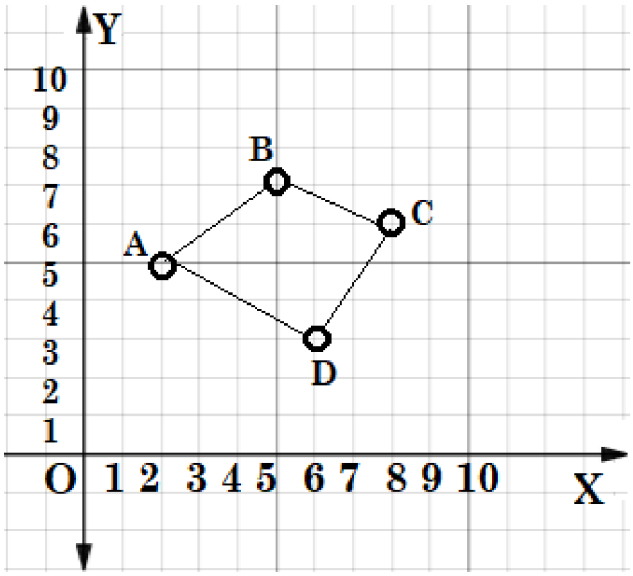
Based on the above information, answer the following questions.

(i) Find the height of the building.
(ii) Find the distance of the observer from the car when it makes angle of 60°.
(iii) Find the distance between the two positions of the car.

OR

(iii) Find the total time taken by the car to reach foot of the building from the starting point.

37. **CASE STUDY II :** Students of a city school are standing in rows and columns in their school ground to celebrate their annual sports day.
A, B, C and D are the positions of four students as shown in the figure.



Based on the above information, answer the following questions.

(i) Assume that the sports teacher is sitting at the origin (O), then which of the four students is closest to him?

(ii) Write the distance between A and C.

(iii) Find the coordinates of the mid-point of line segment AC.

OR

(iii) If a point P divides the line segment AD in the ratio 1:2, then find the coordinates of P.

38. **CASE STUDY III :** In a board game, the no. of sea shells in various cells forms an arithmetic progression.

If the number of sea shells in the 3^{rd} and 11^{th} cell together is 68 and number of shells in the 11^{th} cell is 24 more than that of 3^{rd} cell, then answer the following questions.

(i) What is the difference between the number of sea shells in the 20^{th} and 18^{th} cells?

(ii) How many sea shells are there in the first cell?

(iii) How many total sea shells are there in first 15 cells?

OR

(iii) What is the sum of number of sea shells in the 8^{th} and 9^{th} cell?

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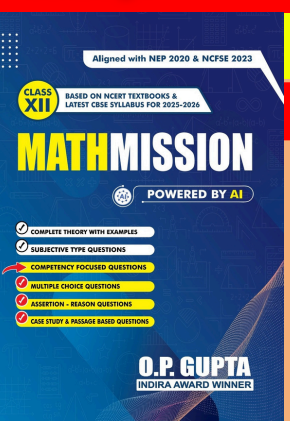

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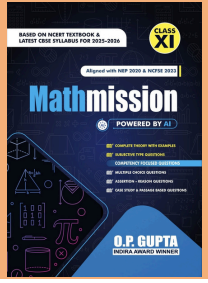

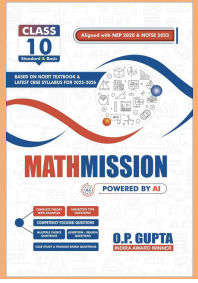

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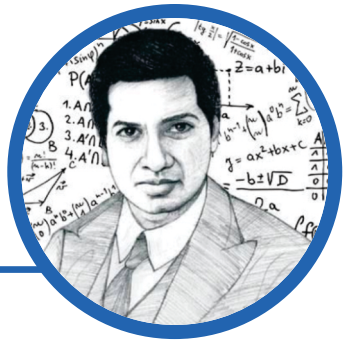
“

An equation means nothing to me
unless it expresses a thought of God.

SRINIVASA RAMANUJAN



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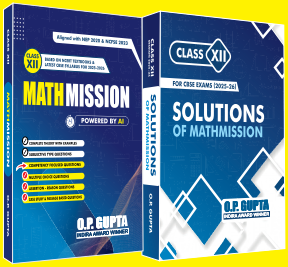

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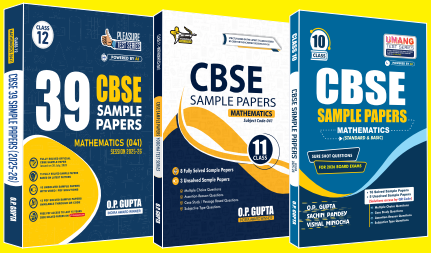

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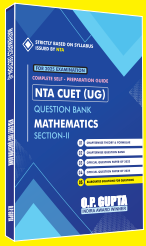

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