10 CLASS

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MATHEMATICS

(STANDARD & BASIC)

SURE SHOT QUESTIONS

FOR 2026 BOARD EXAMS

O.P. GUPTA

SACHIN PANDEY

VISHAL MINOCHA

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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-24)

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 number of polynomials having zeroes -5 and 5 is

(a) only one (b) infinite (c) exactly two (d) at most two

02. The pair of equations $ax+2y=9$ and $3x+by=18$ represent parallel lines, where a and b are integers, if

(a) $a=b$ (b) $3a=2b$ (c) $2a=3b$ (d) $ab=6$

03. The common difference of the A.P. whose n^{th} term is given by $a_n=6n-7$, is

(a) 6 (b) 3 (c) 3n (d) 1

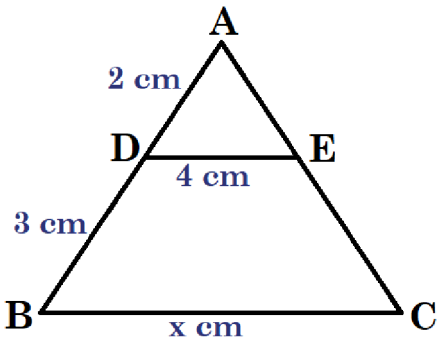
04. In the given figure, $DE \parallel BC$. The value of x is

(a) 6

(b) 12.5

(c) 8

(d) 10



05. If a root of the equation $x^2+ax+3=0$ is 1, then its other root will be

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

06. If $\tan\theta=\frac{5}{12}$, then the value of $\left(\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}\right)$ is

(a) $-\frac{17}{7}$ (b) $\frac{17}{7}$ (c) $\frac{17}{13}$ (d) $-\frac{17}{13}$

07. (x, y) is 5 units away from the origin. How many such points lie in the third quadrant?

(a) 0 (b) 1 (c) 2 (d) infinitely many

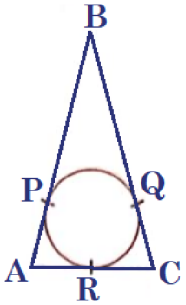
08. In the given figure, $AB=BC=10$ cm. If $AC=7$ cm, then the length of BP is

(a) 3.5 cm

(b) 7 cm

(c) 6.5 cm

(d) 5 cm



09. Water in a river which is 3 m deep and 40 m wide is flowing at the rate of 2 km/h. How much water will fall into the sea in 2 minutes?

(a) 800 m^3 (b) 4000 m^3 (c) 8000 m^3 (d) 2000 m^3

10. If the mean and the median of a data are 12 and 15 respectively, then its mode is

(a) 13.5 (b) 21 (c) 6 (d) 14

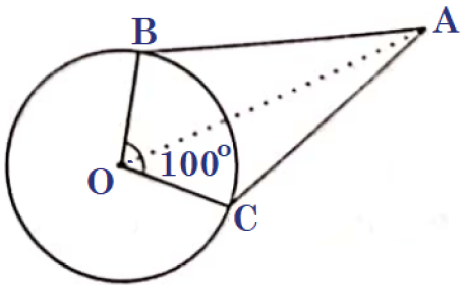
11. In the given figure, if AB and AC are two tangents to a circle with centre O, so that $\angle BOC = 100°$, then $\angle OAB$ is

(a) 70°

(b) 40°

(c) 60°

(d) 50°



12. If $\sin A + \sin^2 A = 1$, then the value of the expression $(\cos^2 A + \cos^4 A)$ is

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

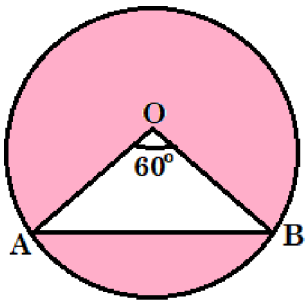
13. O is the centre of a circle of radius 5 cm. The chord AB subtends an angle 60° at the centre. Area of the shaded portion is equal to (approximately)

(a) 50 cm^2

(b) 62.78 cm^2

(c) 49.88 cm^2

(d) 67.75 cm^2



Use $\pi = \frac{22}{7}$, $\sqrt{3} = 1.73$.

14. 11^{th} term from the end in the A.P. : 10, 7, 4, ..., −62 is

(a) 25 (b) 16 (c) −32 (d) 0

15. 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) $\frac{3}{4}$

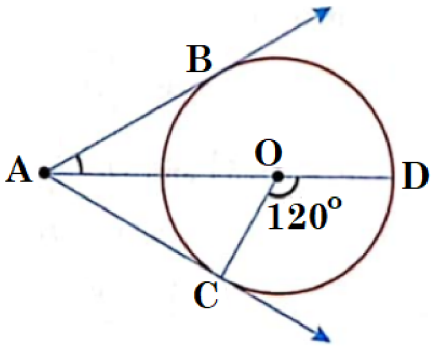
16. In the given figure, AC and AB are tangents to a circle centred at O. If $\angle COD = 120°$, then $\angle BAO$ is equal to

(a) 30°

(b) 60°

(c) 45°

(d) 90°



17. Two dice are thrown together.
The probability of getting of difference of numbers on their upper faces equals to 3 is

(a) $\frac{1}{9}$ (b) $\frac{2}{9}$ (c) $\frac{1}{6}$ (d) $\frac{1}{12}$

18. The sum of upper limit and lower limit of modal class is

Pocket expenses (in ₹)	Number of students (Frequency)
0-5	10
5-10	20
10-15	28
15-20	42
20-25	50
25-30	30

(a) 48 (b) 45 (c) 30 (d) 50

*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) :** If the points $A(4, 3)$ and $B(x, 5)$ lie on a circle with centre $O(2, 3)$, then the value of x is 2.

Reason (R) : Centre of a circle is the mid-point of each chord of the circle.

20. **Assertion (A) :** The number 8^n cannot end with the digit 0, where n is a natural number.

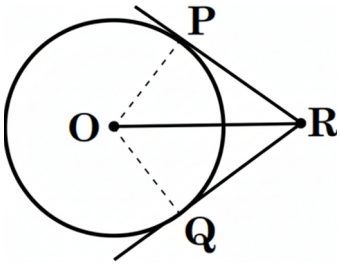
Reason (R) : Prime factorisation of 8 has only two factors, 1 and 8.

SECTION B

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

21. Two tankers contain 850 L and 680 L of petrol, respectively. Find the maximum capacity of a container which can measure the petrol of either tanker, in exact number of times.

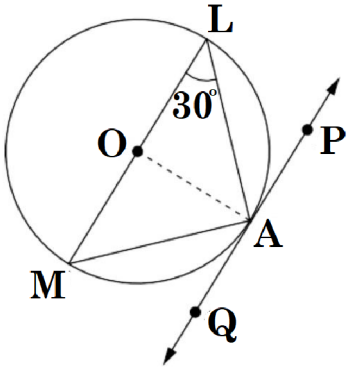
22. In the figure given below, two tangents RQ and RP are drawn from an external point R to the circle with centre O.



If $\angle PRQ = 120°$, then prove that $OR = PR + RQ$.

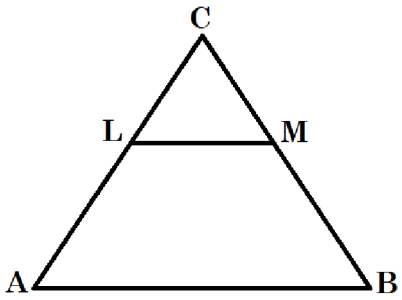
OR

In the figure, O is the centre of circle with LM as a diameter.



If PQ is a tangent to the circle at A and $\angle ALM = 30°$, then find $\angle PAL$.

23. In the given figure, $LM \| AB$. If $AL = x-3$, $AC = 2x$, $BM = x-2$ and $BC = 2x+3$, then find the value of x.



24. A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in figure.

Then find

(i) the total length of the silver wire required.

(ii) the area of each sector of the brooch.

25. If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, then prove that $a^2 + b^2 = m^2 + n^2$.

OR

Prove that $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2\,\text{cosec}\,A$.

SECTION C

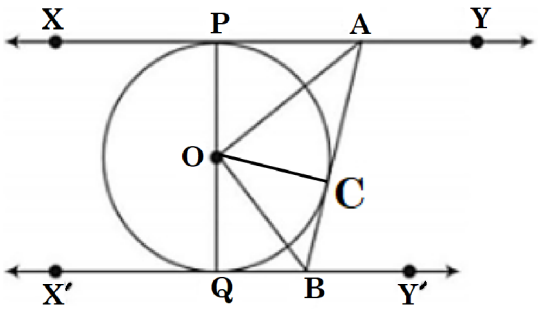
*(Question numbers 26 to 31 carry **3 marks** each.)*

26. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 7 a.m., at what time will they change together next?

27. If α and β are the zeroes of the quadratic polynomial $f(x) = kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$, find the value of k.

28. In the given figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and $X'Y'$ at B.

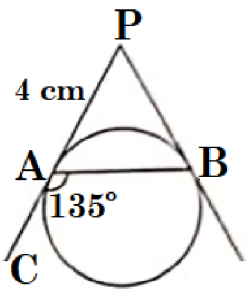
Prove that $\angle AOB = 90°$.



OR

In the given figure, PA and PB are tangents to a circle from an external point P such that $PA = 4$ cm and $\angle BAC = 135°$.

Find the length of chord AB.



29. Shyam and Radhika are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. Had they walked in the same direction with same speeds as before, they would have met in 8 hours. Find their walking speeds.

30. Prove that $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\ \text{cosec}\,\theta$.

OR

If $m=\cos\theta-\sin\theta$ and $n=\cos\theta+\sin\theta$, then show that $\sqrt{\frac{m}{n}}+\sqrt{\frac{n}{m}}=\frac{2}{\sqrt{1-\tan^2\theta}}$.

31. Find the median of the following frequency distribution:

Classes	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	14	22	16	6	5	3	4

SECTION D

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

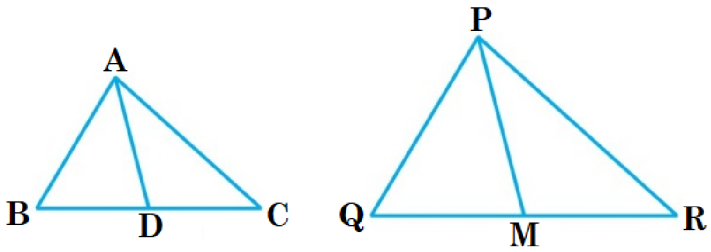
32. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed?

OR

To fill a swimming pool, two pipes are used. If the pipe of large diameter used for 4 hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. Find how long it would take for each pipe to fill the pool separately, if the pipe of smaller diameter takes 10 hours more than the pipe of larger diameter to fill the pool?

33. State Thales theorem and using concept of Similarity prove the following.

Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.



34. Find the value of p and q for the following distribution, if the mean is 1.46.

Number of accidents	Number of days (frequency)
0	46
1	p
2	q
3	25
4	10
5	5
Total	200

35. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8 m and height 3.5 m and the upper part is conical with the same base radius, but of height 2.1 m. If the canvas used to make the tents costs ₹120 per m^2, find the amount shared by each school to set up the tents.

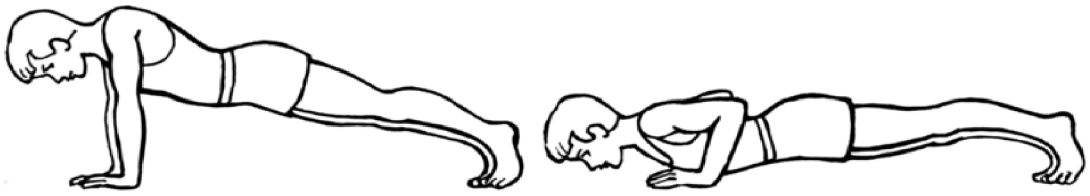
OR

A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of hemisphere is 3.5 cm and the total wood used in the making of toy is $166\frac{5}{6}$ cm^3. Find the height of the toy. Also find the cost of painting the hemisphere part of the toy at the rate of ₹10 per cm^2.

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 :** Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics. While the push-up primarily targets the muscles of the chest, arms and shoulders, support required from other muscles helps in toning up the whole body.



Dishant wants to participate in the push-up challenge. He can currently make 1500 push-ups in one hour. But he wants to achieve a target of 2500 push-ups in 1 hour for which he practices regularly. With each day of practice, he is able to make 5 more push-ups in one hour as compared to the previous day. If on first day of practice he makes 1500 push-ups and continues to practice regularly till his target is achieved.

Based on the above information, solve the following questions.

(i) Form an A.P. representing the number of push-ups per day.

(ii) Find the minimum number of days Dishant needs to practice before the day his goal is accomplished.

OR

(ii) If Dishant wants to achieve a target of 3000 push-ups in 1 hour, then find the minimum number of days he need to practice before the day his goal is accomplished.

(iii) Determine the total number of push-ups performed by Dishant up to the day his goal is achieved.

37. **CASE STUDY II :** Mayank and Priyanshu planned to play Business (board game) in which they had to use two dice.

(i) Mayank got first chance to roll the dice. What is the probability that he got the 'sum of the two numbers appearing on the top face of the dice as 8'?

(ii) Priyanshu got next chance in the game. What is the probability that he got the 'sum of the two numbers appearing on the top face of the dice as 13'?

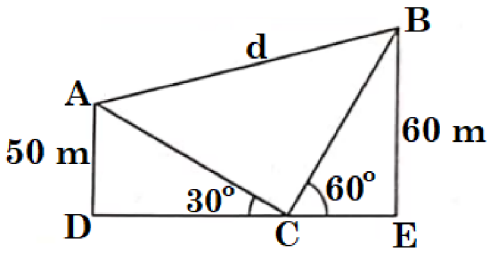
(iii) What is the probability that Priyanshu got the 'sum of the two numbers appearing on the top face of the dice as 7'?

OR

(iii) Now it was again Mayank's turn. He rolled the dice. What is the probability that he got the 'sum of the two numbers appearing on the top face of the dice as greater than 8'?

38. **CASE STUDY III :** Kite festival is celebrated in many countries at different times of the year. In India, every year 14th January is celebrated as International Kite Day. On this day many people visit India and participate in the festival by flying various kinds of kites.

The picture given below, three kites flying together.



In figure, the angles of elevation of two kites (Points A and B) from the hands of a man (Point C) are found to be 30° and 60° respectively. Taking AD = 50 m and BE = 60 m, solve the following questions.

(i) Find the length of string used (take them straight) for kite A as shown in the figure.

(ii) Find the length of string used (take them straight) for kite B as shown in the figure.

(iii) Find the distance DE.

OR

(iii) Find the distance 'd' between these two kites.

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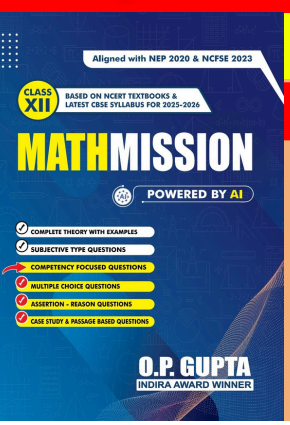

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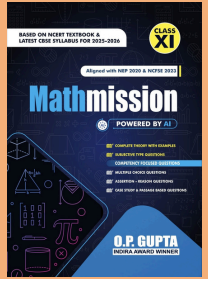

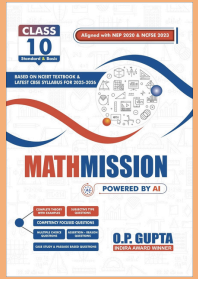

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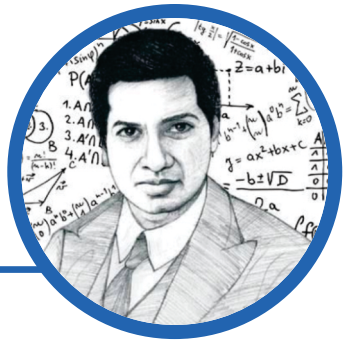
“

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

SRINIVASA RAMANUJAN



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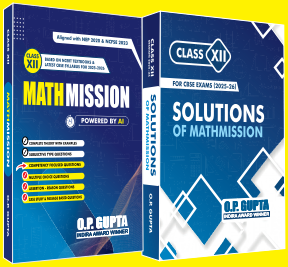

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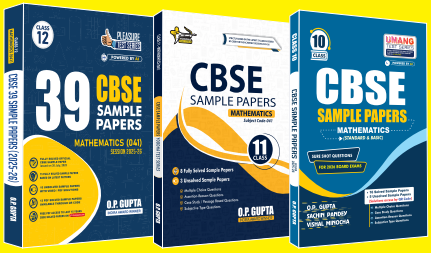

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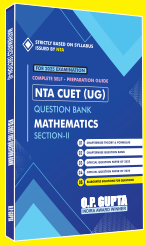

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