10 CLASS

UMANG TEST SERIES

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CBSE SAMPLE PAPERS

MATHEMATICS

(STANDARD & BASIC)

SURE SHOT QUESTIONS

FOR 2026 BOARD EXAMS

O.P. GUPTA

SACHIN PANDEY

VISHAL MINOCHA

- 16 Solved Sample Papers
- 5 Unsolved Sample Papers

(Solutions access by QR Code)

- Multiple Choice Questions
- Case Study Questions
- Assertion-Reason Questions
- Subjective Type Questions

UMANG TEST SERIES

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

MATHEMATICS (UTS-01)

a compilation by

O.P. GUPTA — INDIRA AWARD WINNER

SACHIN PANDEY — PGT - ST. MARY'S SCHOOL

VISHAL MINOCHA — DIRECTOR - VISHAL INSTITUTE

Time Allowed : 180 Minutes **Max. Marks : 80**

General Instructions :

1. This Question paper contains **five sections** - A, B, C, D and E.
2. Section A has **20 MCQs** of **1 mark** each.
   Section B has **05 questions** of **2 marks** each.
   Section C has **06 questions** of **3 marks** each.
   Section D has **04 questions** of **5 marks** each.
   Section E has **03 Case-based integrated units of assessment** with three **sub-parts** of **1, 1 and 2 marks** each.
3. Each section is compulsory. However, there are internal choices in some questions.
   The **internal choice** has been provided in
   - **02 Questions of Section B**
   - **02 Questions of Section C**
   - **02 Questions of Section D**
   - **03 Questions of Section E**

   You have to attempt only one of the alternatives in all such questions.
4. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

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. HCF and LCM of two numbers x and y are 3 and 105. If $x + y = 36$, then the value of $\frac{1}{x} + \frac{1}{y}$ is

(a) $\frac{1}{25}$ (b) $\frac{4}{35}$ (c) 35 (d) 315

02. If $x = -2$ is one of the zero of $x^2 - x - 6$, then its other zero is

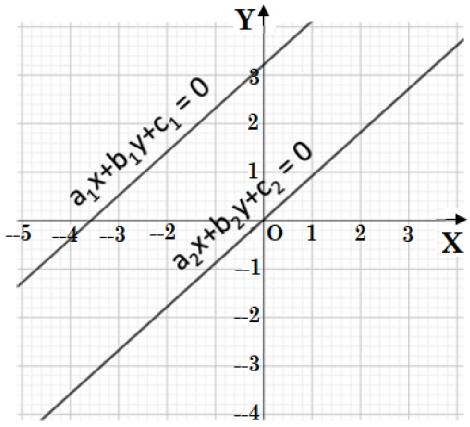
(a) -3 (b) $\frac{1}{3}$ (c) 3 (d) 2

03. The lines representing the given pair of linear equations are non-intersecting.

Which of the following statements is true?

(a) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(c) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$



04. If O is the centre of the circle and chord CD makes an angle of 70° with the tangent CP at the point of contact C, then the angle subtended by the chord at the centre is

(a) 140° (b) 100° (c) 90° (d) 40°

05. What is the ratio in which the line segment joining (2, –3) and (5, 6) is divided by x-axis?

(a) 1:2 (b) 2:1 (c) 2:5 (d) 5:2

06. The nature of roots of the equation $9x^2 - 6x - 2 = 0$ is

(a) No real roots (b) 2 equal real roots

(c) 2 distinct real roots (d) More than 2 real roots

07. The first negative term of the A.P. $\frac{81}{5}, \frac{77}{5}, \frac{73}{5}, \ldots$ is

(a) 23^{rd} term (b) 20^{th} term (c) 21^{st} term (d) 22^{nd} term

08. If $\sin 30^\circ \tan 45^\circ = \frac{\sec 60^\circ}{k}$, then the value of k is

(a) 1 (b) 2 (c) 3 (d) 4

09. If in two triangles ΔDEF and ΔPQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is **not** true?

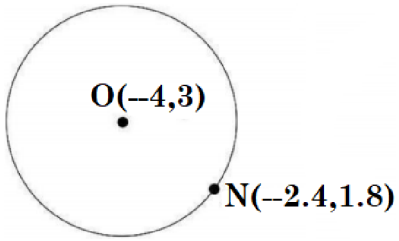
(a) $\frac{DE}{QR} = \frac{DF}{PQ}$ (b) $\frac{DE}{PQ} = \frac{EF}{RP}$ (c) $\frac{EF}{PR} = \frac{DF}{PQ}$ (d) $\frac{EF}{RP} = \frac{DE}{QR}$

10. The coordinates of the centre O of the circle and a point N on the circle are shown in the given figure.

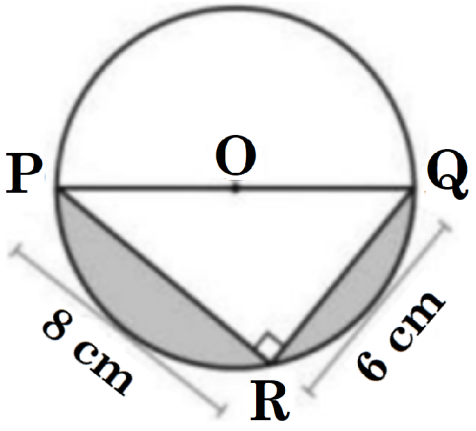
What is the radius of the circle?

(a) $\sqrt{0.4}$ units (b) 4 units

(c) 2 units (d) $\sqrt{42.4}$ units



11. In the given figure, O is the centre of the circle. PR and RQ are chords of the circle. The radius of the circle is 5 cm, PR = 8 cm, QR = 6 cm and $\angle PRQ = 90^\circ$.



What is the area (in cm^2) of the shaded region?

(a) $\left(\frac{25\pi}{4} - 24\right)$ (b) $\left(\frac{25\pi}{2} - 24\right)$

(c) $\left(\frac{25\pi}{4}\right)$ (d) $\left(\frac{25\pi}{2}\right)$

12. The following table shows the value of cosecant and secant of different angles.

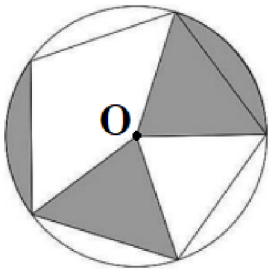
θ	30°	60°
cosec θ	P	1.154
sec θ	1.154	Q

Then the value of $(P + Q)$ is

(a) 0 (b) $\frac{1+\sqrt{3}}{2}$ (c) 4 (d) $2\left(1+\frac{1}{\sqrt{3}}\right)$

13. A regular pentagon is inscribed in a circle with centre O, of radius 5 cm, as shown in the given figure.

What is the area of the shaded portion of the circle?

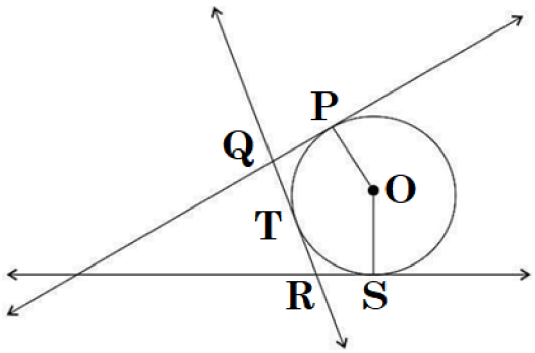


(a) 2π cm^2 (b) 4π cm^2
(c) 5π cm^2 (d) 10π cm^2

14. Which of the following cannot be obtained graphically?
(a) Mean (b) Median (c) Mode (d) None of these

15. Yash participated in a game along with his friends. His probability of winning the game is 0.07, then what is the probability of losing the game?
(a) 0.03 (b) 0.93 (c) 0.3 (d) 0.33

16. In the given figure, tangents are drawn to a circle, with centre O, at points P, T and S.



If QR = 12 cm and the radius of the circle is 7 cm, what is the perimeter of the polygon PQTRSO?

(a) 26 cm (b) 31 cm
(c) 38 cm (d) 45 cm

17. If $\alpha+\beta=90^\circ$ and $\alpha=2\beta$, then $\cos^2\alpha+\sin^2\beta$ is equal to

(a) 1 (b) $\frac{1}{2}$ (c) 0 (d) 2

18. A box contains cards numbered 6 to 50. A card is drawn at random from the box. The probability that the drawn card has a number which is either a multiple of 2 or a multiple of 5?

(a) $\frac{34}{45}$ (b) $\frac{27}{44}$ (c) $\frac{3}{5}$ (d) $\frac{34}{44}$

*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. Consider an A.P. 3, 9, 15, 21, ….
Assertion (A) : General term (n^{th} term) of A.P. is given by $(6n-3)$.
Reason (R) : Sum of first n terms of the A.P. is given by $(3n^2-1)$.

20. **Assertion (A) :** If radius of a sphere is 'p' units, then its surface area is $(4\pi p^2)$ units^3.
Reason (R) : The volume of a right circular cylinder is 3 times the volume of right circular cone, if they have same dimensions (with the same height and the base-radius).

SECTION B

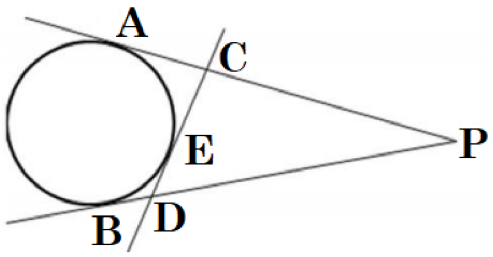
*(Question numbers 21 to 25 carry **2 marks** each.)*

21. If $\sin\theta+\cos\theta=\sqrt{3}$, then find the value of $\sin\theta.\cos\theta$.

OR

Find the value of x : $2\,\text{cosec}^2 30^\circ + x\sin^2 60^\circ - \frac{3}{4}\tan^2 30^\circ = 10$.

22. From an external point P, two tangents, PA and PB are drawn to a circle with centre O.

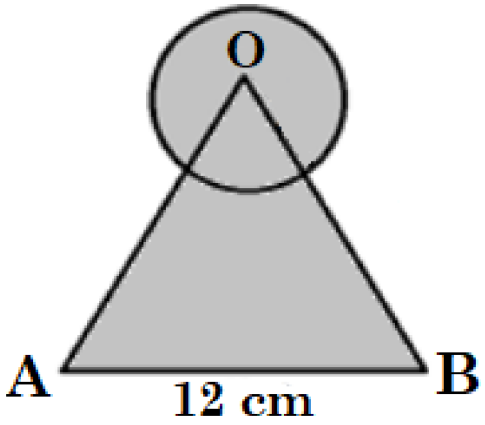


At a point E on the circle, a tangent is drawn to intersect PA and PB at C and D, respectively. If $PA = 15$ cm, then find the perimeter of ΔPCD.

23. X and Y are points on the sides PQ and PR respectively of a ΔPQR.
If $PX = 4$ cm, $XQ = 4.5$ cm, $PY = 8$ cm and $YR = 9$ cm, then show that $XY \parallel QR$.

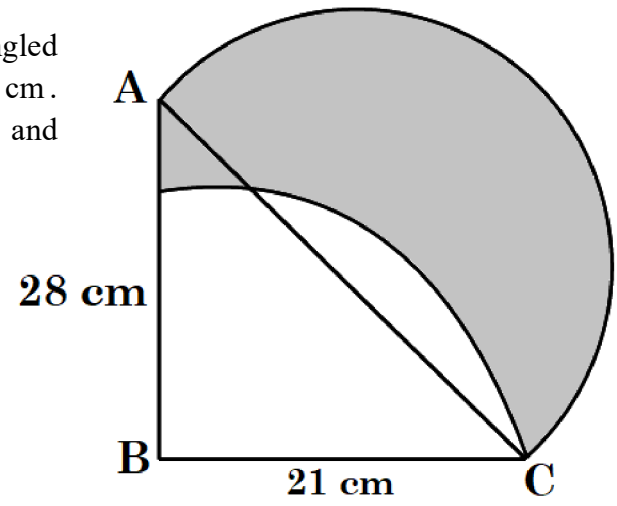
24. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one of the numbers is 280, then find the other number.

25. Find the area of the shaded portion in the given figure below, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



OR

In the given figure below, ABC is a right-angled triangle, $\angle B = 90^\circ$, $AB = 28$ cm and $BC = 21$ cm. With AC as diameter, a semi-circle is drawn and with BC as radius a quarter circle is drawn.
Find the area of the shaded region.



SECTION C

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

26. National Art convention got registrations from students from all parts of the country, of which 65 are interested in music, 104 are interested in dance and 117 students are interested in handicrafts. For optimum cultural exchange, organizers wish to keep them in minimum number of groups such that each group consists of students interested in the same art form and the number of students in each group is the same. Find the number of students in each group. Find the number of groups in each art form. How many rooms are required if each group will be allotted a room?

27. Find the value of k, for which the pair of linear equations $kx+(k-2)y=1$ and $3x+y=5$ has no solutions.

OR

Two people 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 the same speeds as before, they would have met in 8 hours. Find their walking speeds.

28. α and β are the zeroes of polynomial $f(x)=2x^2+5x+m$. Find the value of m, such that $\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$.

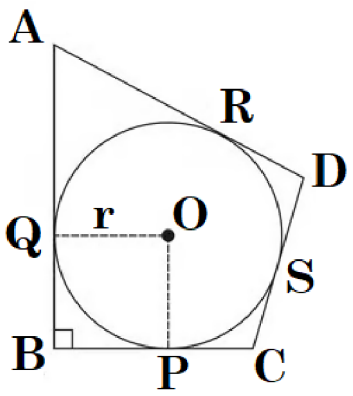
29. If $a\cos\theta+b\sin\theta=c$, then prove that $a\sin\theta-b\cos\theta=\pm\sqrt{a^2+b^2-c^2}$.

30. An isosceles triangle ABC is inscribed in a circle. If $AB=AC=13$ cm and $BC=10$ cm, find the radius of the circle.

OR

Prove that the lengths of tangents drawn from an external point to a circle are equal.
Using the above result, find the radius r of the circle.

Given that a circle is inscribed in a quadrilateral ABCD in which it is known that $\angle B=90^\circ$, $AD=17$ cm, $AB=20$ cm and $DS=3$ cm.



31. The median of the following distribution is 14.4.
Find the values of x and y, if the total frequency is 20.

Class interval	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30
Frequency	4	x	5	y	1

SECTION D

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

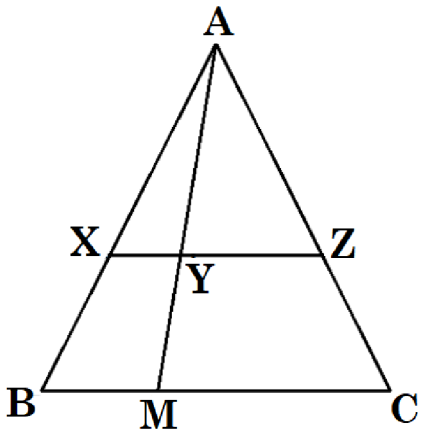
32. Tanu and Manu are competing in a 60 km cycling race. Manu's average speed is 10 km/hr greater than Tanu's average speed and she finished the race in half an hour less than Tanu. Find the time taken by Tanu to finish the race.

OR

At t minutes past 2 p.m., the time needed by the minute hand of a clock to show 3 p.m. was found to be 3 minutes less than $\frac{t^2}{4}$ minutes. Find the value of t.

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 adjacent figure, XZ is parallel to BC, $AZ = 3$ cm, $ZC = 2$ cm, $BM = 3$ cm, $MC = 5$ cm.
Find the length of XY.



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 the original cone. Find the height from the base at which the section is made.

OR

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.

35. The mean of the following data is 50, where the frequencies f_1 and f_2 are missing. Find the missing frequencies.

Class Interval	Frequency
0 - 20	17
20 - 40	f_1
40 - 60	32
60 - 80	f_2
80 - 100	19
Total	120

Also find the mode of the data.

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. Rohan was playing with cards and he created a structure with cards by stacking them on top of each other in the shape of pyramid. Each small triangle is made using 3 cards and each layer has 1 less triangle than the layer below it.

Based on the given information, answer the following questions.

(i) Rohan's younger brother Naman and his friends wanted to use 3 cards in the top layer and 18 in the bottom layer. Form an A.P., showing the number of cards in each layer starting from the top layer. Write the common difference of A.P.

(ii) Naman is planning to make another pyramid with the top and bottom layer containing 15 and 138 cards respectively. How many layers will such a pyramid have?

(iii) Suppose they have a total of 360 cards with them. Find the maximum number of layers that Naman can make using the cards they have, if they want to have 1 triangle i.e., 3 cards at the top layer.

OR

(iii) If the value of $t_n = 183$, then find the number of cards in the middle layer.

37. An aeroplane is a vehicle with the wings and one or more engines that enable it to fly through the air.

An aeroplane flying at a height of 600 m observes the angles of depressions of opposite points on the two banks P and Q of river to be 30° and 60°.

Use the above information to answer the questions that follows.

(i) Draw a neat labeled figure to show the above situation diagrammatically.

(ii) Find the width of the river.

(iii) Find the distance of aeroplane from point P.

OR

(iii) Find the distance of aeroplane from point Q.

38. In a classroom, 2 friends Pawan and Udit are seated at the points A(–5, 3) and B(5, 3) respectively. Their friend Raja entered the classroom and want to sit on a seat C such that an

equilateral triangle should be formed and the centre of the classroom O(0, 0) lies inside the triangle. Use $\sqrt{3} = 1.7$, if required.

Based on the above information, answer the following questions.

(i) Show the position of Pawan and Udit on a graph.

(ii) What is the measure of each side of the equilateral triangle so formed?

(iii) Find the coordinates of position of Raja.

OR

(iii) Show the position of Raja on the graph. Also find the area of the triangle so formed.

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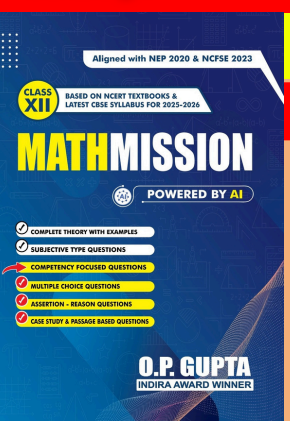

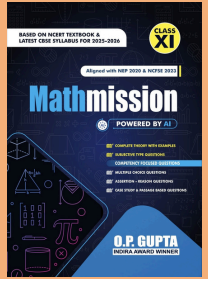

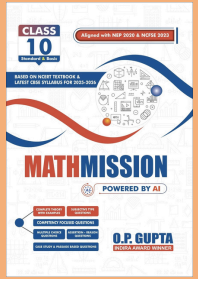

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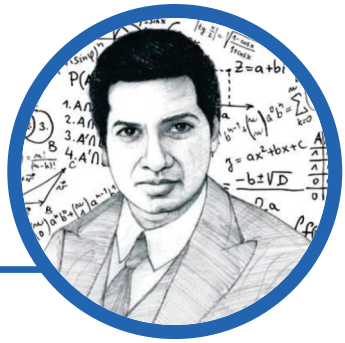

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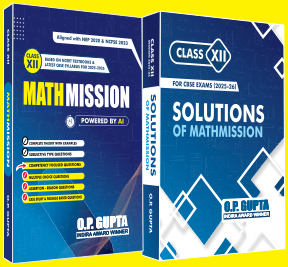

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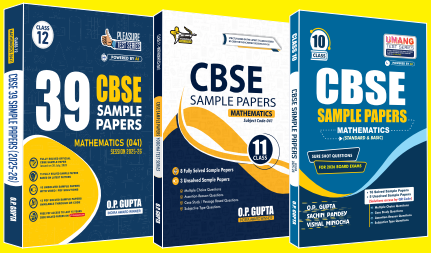

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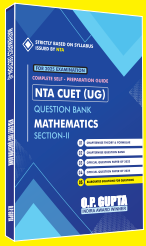

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