Sample Paper 28

Class - 10th Exam - 2026 - 27

Mathematics - Basic

Time : 3 Hours **Max. Marks : 80**

General Instructions :

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \frac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION - A

Section A consists of 20 questions of 1 mark each.

1. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively, then the height of the tower is

(a) 14.64 m (b) 28.64 m

(c) 38.64 m (d) 19.64 m

2. A solid piece of iron in the form of a cuboid of dimensions $49\,\text{cm} \times 33\,\text{cm} \times 24\,\text{cm}$, is moulded to form a solid sphere. The radius of the sphere is

(a) 21 cm (b) 23 cm

(c) 25 cm (d) 19 cm

3. If the mean of the squares of first n natural numbers is 105, then the first n natural numbers is

(a) 8 (b) 9

(c) 10 (d) 11

4. If α and β are the zeroes of the polynomial $2x^2 - 13x + 6$, then $\alpha + \beta$ is equal to

(a) -3 (b) 3

(c) $\frac{13}{2}$ (d) $-\frac{13}{2}$

5. A tree is broken by the wind. The top struck the ground at an angle of 30° and at distance of 10 m from its root. The whole height of the tree is ($\sqrt{3} = 1.732$)

(a) $10\sqrt{3}$ m (b) $3\sqrt{10}$ m

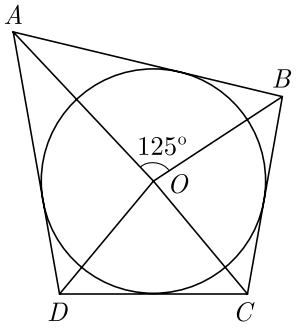
(c) $20\sqrt{3}$ m (d) $3\sqrt{20}$ m

6. A fair die is thrown once. The probability of getting a composite number less than 5 is

(a) $\frac{1}{3}$ (b) $\frac{1}{6}$

(c) $\frac{2}{3}$ (d) 0

7. In figure, if $\angle AOB = 125^\circ$, then $\angle COD$ is equal to



(a) 62.5° (b) 45°

(c) 35° (d) 55°

8. If $x = a$ and $y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then the values of a and b are, respectively

(a) 3 and 5 (b) 5 and 3

(c) 3 and 1 (d) -1 and -3

9. The quadratic equation $5x^2 - 3x + 1 = 0$ has

(a) Two distinct real roots (b) Two equal real roots

(c) No real roots (d) More than 2 real roots

10. If the sum of the areas of two circles with radii R_1 and R_2 is equal to the area of a circle of radius R, then

(a) $R_1 + R_2 = R$ (b) $R_1^2 + R_2^2 = R^2$

(c) $R_1 + R_2 < R$ (d) $R_1^2 + R_2^2 < R^2$

11. The $P(A)$ denotes the probability of an event A, then

(a) $P(A) < 0$ (b) $P(A) > 1$

(c) $0 \leq P(A) \leq 1$ (d) $-1 \leq P(A) \leq 1$

12. If $\cos A = \frac{4}{5}$, then the value of $\tan A$ is

(a) $\frac{3}{5}$ (b) $\frac{3}{4}$

(c) $\frac{4}{3}$ (d) $\frac{5}{3}$

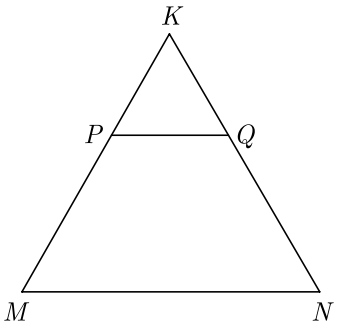
Continue on next page.....

13. The area of a right angled triangle is 40 sq cm and its perimeter is 40 cm. The length of its hypotenuse is

(a) 16 cm (b) 18 cm

(c) 17 cm (d) data insufficient

14. In the figure, PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$ cm then find KQ.



(a) 4.8 cm (b) 4.6 cm

(c) 4.4 cm (d) 4.2 cm

15. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 min and summarised in the table give below.

Number of cars	**Frequency**
0-10	7
10-20	14
20-30	13
30-40	12
40-50	20
50-60	11
60-70	15
70-80	08

Then, the mode of the data is

(a) 34.7 (b) 44.7

(c) 54.7 (d) 64.7

16. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are

(a) Both positive

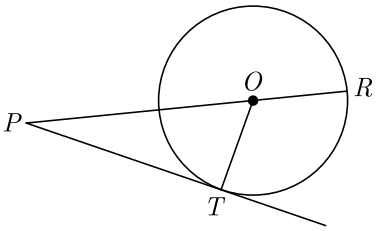
(b) Both negative

(c) One positive and one negative

(d) Both equal

Continue on next page.....

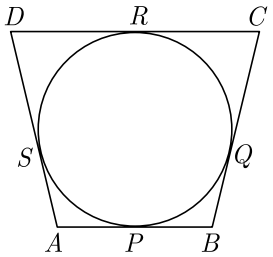
17. In figure, on a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of the circle, then the length of PR is



(a) 30 cm (b) 28 cm

(c) 32 cm (d) 25 cm

18. In the given figure, a circle touches all the four sides of quadrilateral $ABCD$ with $AB = 6$ cm, $BC = 7$ cm and $CD = 4$ cm, then length of AD is



(a) 3 cm (b) 4 cm

(c) 5 cm (d) 6 cm

19. **Assertion :** $\sin^2 67^\circ + \cos^2 67^\circ = 1$

Reason : For any value of $\theta, \sin^2\theta + \cos^2\theta = 1$

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

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

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

20. **Assertion :** If sum of the first n terms of an AP is given by $S_n = 3n^2 - 4n$. Then its n^{th} term is $a_n = 6n - 7$.

Reason : n^{th} term of an AP, whose sum to n terms is S_n, is given by $a_n = S_n - S_{n-1}$

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

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

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Continue on next page.....

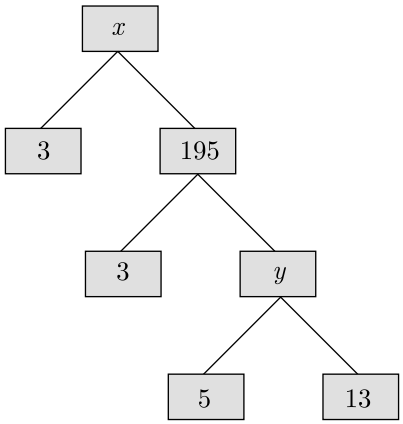
SECTION - B

Section B consists of 5 questions of 2 marks each.

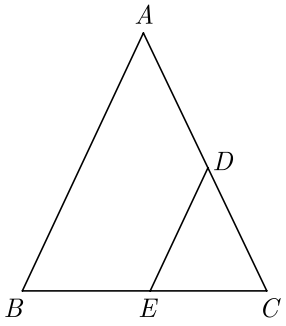
21. Find the smallest natural number by which 1200 should be multiplied so that the square root of the product is a rational number.

OR

Complete the following factor tree and find the composite number x.



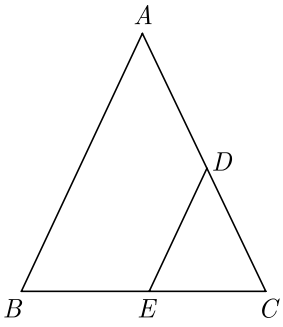
22. In the figure of ΔABC, the points D and E are on the sides CA, CB respectively such that $DE || AB$, $AD = 2x, DC = x + 3, BE = 2x - 1$ and $CE = x$. Then, find x.



OR

In the figure of ΔABC, $DE || AB$. If $AD = 2x$, $DC = x + 3, BE = 2x - 1$ and $CE = x$, then find the value of x.

Continue on next page.....



23. Show that : $\dfrac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)}=1$

24. Find the mean of the following distribution :

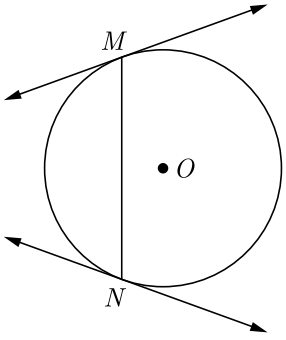
Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	5	4	1	6	4

OR

Find the sum of the lower limit of the median class and the upper limit of the modal class :

Classes	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	3	5	9	7	3

25. Prove that tangents drawn at the ends of a chord of a circle make equal angles with the chord.



Continue on next page.....

SECTION - C

Section C consists of 6 questions of 3 marks each.

26. The weekly expenditure of 500 families is tabulated below :

Weekly Expenditure(Rs.)	Number of families
0-1000	150
1000-2000	200
2000-3000	75
3000-4000	60
4000-5000	15

Find the median expenditure.

27. The 17^{th} term of an AP is 5 more than twice its 8^{th} term. If 11^{th} term of AP is 43, then find its n^{th} term.

28. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of sector formed by the arc.

OR

A road which is 7 m wide surrounds a circular park whose circumference is 88 m. Find the area of the road.

29. The co-ordinates of the vertices of ΔABC are $A(7,2)$, $B(9,10)$ and $C(1,4)$. If E and F are the mid-points of AB and AC respectively, prove that $EF = \frac{1}{2}BC$.

OR

Find the ratio in which the line $2x+3y-5=0$ divides the line segment joining the points $(8,-9)$ and $(2,1)$. Also find the co-ordinates of the point of division.

30. The length, breadth and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.

31. Prove that : $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$

Continue on next page.....

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Solve graphically the pair of linear equations :
$3x-4y+3=0$ and $3x+4y-21=0$
Find the co-ordinates of the vertices of the triangular region formed by these lines and $x-$axis. Also, calculate the area of this triangle.

OR

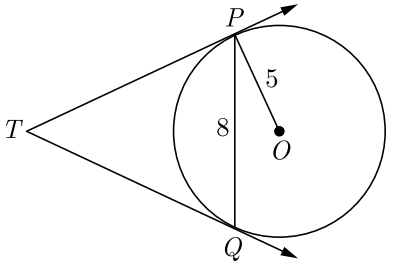
Solve the following pair of equations graphically:

$$2x+3y\ =12,\ x-y-1=0.$$

Shade the region between the two lines represented by the above equations and the X-axis.

33. A toy is in the form of a cylinder of diameter $2\sqrt{2}$ m and height 3.5 m surmounted by a cone whose vertical angle is 90°. Find total surface area of the toy.

34. In Figure, PQ is a chord of length 8 cm of a circle of radius 5 cm and centre O. The tangents at P and Q intersect at point T. Find the length of TP.



35. Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the angle of elevation of the top of a pole is 60° and the angle of depression from the top of the other pole of point P is 30°. Find the heights of the poles and the distance of the point P from the poles.

OR

Two post are k metre apart and the height of one is double that of the other. If from the mid-point of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorted post.

Continue on next page.....

SECTION - E

Section E consists of 3 case study based questions of 4 marks each.

36. Optimal Pricing Strategy : The director of the National School of Drama must decide what to charge for a ticket to the comedy drama. If the price is set too low, the theatre will lose money; and if the price is too high, people won't come. From past experience she estimates that the profit P from sales (in hundreds) can be approximated by $P(x) = -x^2 + 22x - 40$ where x is the cost of a ticket and $0 \le x \le 25$ hundred rupees.



(i) What is the lowest and highest cost of a ticket that would allow the theatre to break even?

(ii) If theatre charge Rs 4 hundred for each ticket, what is the profit/loss ?

OR

If theatre charge Rs 25 hundred for each ticket, what is the profit/loss ?

(iii) What is the maximum profit which can be earned by theatre ?

37. Hospital Stays : Hospital records indicated that maternity patients stayed in the hospital for the number of days shown in the distribution.

Number of days stayed	Frequency
3	13
4	22
5	45
6	14
7	6
	100



Find these probabilities.

(i) A patient stayed exactly 5 days.

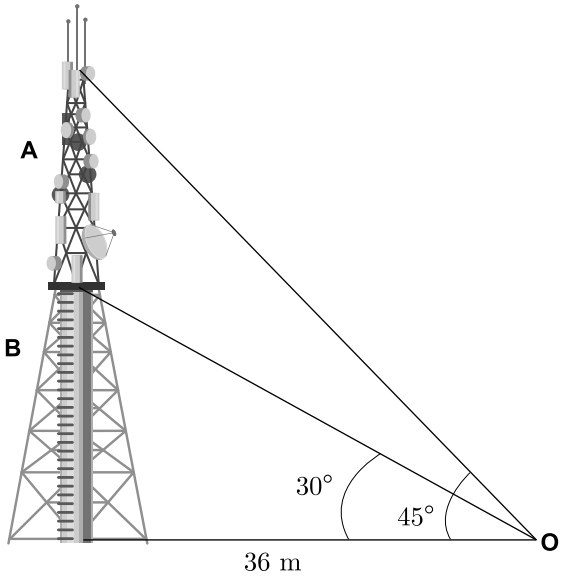
(ii) A patient stayed less than 6 days.

(iii) A patient stayed at most 4 days.

(iv) A patient stayed at least 5 days.

38. Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes. They are among the tallest human-made structures. There are 2 main types: guyed and self-supporting structures.

On a similar concept, a radio station tower was built in two sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 m. From point O, the angle of elevation of the top of section B is 30° and the angle of elevation of the top of section A is 45°.



(i) What is the height of the section B ?

(ii) What is the height of the section A ?

(iii) What is the length of the wire structure from the point O to the top of section A ?

OR

What is the length of the wire structure from the point O to the top of section B ?

****