

# CBSE EXAMINATION PAPER-2025

## MATHEMATICS

(Solved)

Time allowed : 3 hours

Maximum Marks : 84

### General Instructions :

Read the following instructions carefully and follow them :

- i. This question paper contains **43 questions**. All questions are **compulsory**.
- ii. This question paper is divided into **5 sections**.
- iii. **Section A** – questions number **1 to 18** are multiple choice questions Each question carries **1 marks**.
- iv. **Section B** – questions number **19 to 24** are very short answer Each question carries **2 marks**.
- v. **Section C** – questions number **25 to 32** are short answer Each question carries **3 marks**.
- vi. **Section D** – questions number **33 to 33** are case based questions
- vii. **Section E** – questions number **34 to 39** are long answer Each question carries **5 marks**.
- viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.
- ix. Use of calculator is NOT allowed.

### Section A

**Question 1.** If  $7 \cos^2\theta + 3 \sin^2\theta = 4$ , then the value of  $\theta$  is:

[1 Marks]

(A)  $30^\circ$

(B)  $45^\circ$

(C)  $60^\circ$

(D)  $90^\circ$

**Question 2.**

The probability of drawing an even prime number out of numbers from 1 to 30 is:

[1 Marks]

(A)  $7/30$

(B)  $4/15$

(C) 0

(D)  $1/30$

**Question 3.**

The quadratic equation whose roots are 7 and  $1/7$  is:

[1 Marks]

(A)  $7x^2 - 50x + 7 = 0$

(B)  $7x^2 + 50x - 1 = 0$

(C)  $7x^2 - 50x + 1 = 0$

(D)  $7x^2 + 50x - 7 = 0$

**Question 4.**

The least number which is a perfect square and is divisible by each of 16, 20 and 50 is:

[1 Marks]

(A) 100

(B) 2400

(C) 3600

(D) 1200

### Question 5.

The coordinates of the end points of a diameter of a circle are  $(5, -2)$  and  $(5, 2)$ . The length of the radius of the circle is:

[1 Marks]

(A)  $\pm 2$

(B) 4

(C)  $\pm 4$

(D) 2

### Question 6.

The points  $(-5,0)$ ,  $(5,0)$  and  $(0,4)$  are the vertices of a triangle which is a/an:

[1 Marks]

(A) scalene triangle

(B) equilateral triangle

(C) isosceles triangle

(D) right-angled triangle

### Question 7.

In the given figure, RS is the tangent to the circle at the point L and MN is the diameter. If  $\angle NML = 30^\circ$ , then  $\angle RLM$  is:

[1 Marks]

(A)  $30^\circ$

(B)  $90^\circ$

(C)  $60^\circ$

(D)  $120^\circ$

### Question 8.

In the given figure,  $PQ \parallel BC$ . If  $AP/PB = 4/13$  and  $AC = 20.4$  cm, then the length of AQ is:

[1 Marks]

(A) 4.8 cm

(B) 3.8 cm

(C) 5.8 cm

(D) 2.8 cm

**Question 9.** Which of the following statements is incorrect?

[1 Marks]

(A) A square and a rhombus of the same area are always similar.

(B) Two congruent figures are always similar.

(C) Two similar triangles need not be congruent.

(D) Two equilateral triangles are always similar.

**Question 10.** The sum of the exponents of prime factors in the prime factorisation of 4004 is:

[1 Marks]

(A) 5

(B) 4

(C) 3

(D) 2

**Question 11.**

In a cricket match, a batsman hits the boundary 7 times out of the 42 balls he plays. The probability of his not hitting a boundary is:

[1 Marks]

(A)  $\frac{1}{7}$

(B)  $\frac{2}{7}$

(C)  $\frac{1}{6}$

(D)  $\frac{5}{6}$

**Question 12.** If a large circular pizza is divided into 5 equal sectors, then the central angle of each sector will be:

[1 Marks]

(A)  $60^\circ$

(B)  $90^\circ$

(C)  $45^\circ$

(D)  $72^\circ$

**Question 13.**

If  $\sin 30^\circ \tan 45^\circ = \sec 60^\circ / k$ , then the value of k is:

[1 Marks]

(A) 3

(B) 2

(C) 1

(D) 4

**Question 14.** The line represented by the equation  $x - y = 0$  is:

[1 Marks]

(A) parallel to x-axis

(B) parallel to y-axis

(C) passing through the origin

(D) passing through the point (3, 2)

**Question 15.**

If -4 is a zero of the polynomial  $p(x) = x^2 - x - (2 + 2k)$ , then the value of k is:

[1 Marks]

(A) -9

(B) 9

(C) 6

(D) 3

**Question 16.** The equation of a line parallel to the x-axis and at a distance of 3 units below x-axis is:

[1 Marks]

(A)  $x = 3$

(B)  $x = -3$

(C)  $y = -3$

(D)  $y = 3$

**Question 17.** The HCF of 40, 110 and 360 is:

[1 Marks]

(A) 40

(B) 360

(C) 10

(D) 110

**Question 18.**

Assertion (A) : The pair of linear equations  $px + 3y + 59 = 0$  and  $2x + 6y + 118 = 0$  will have infinitely many solutions if  $p = 1$ .

Reason (R): If the pair of linear equations  $px + 3y + 19 = 0$  and  $2x + 6y + 157 = 0$  has a unique solution, then  $p \neq 1$ .

[1 Marks]

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

(B) Assertion (A) is false, but Reason (R) is true.

(C) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(D) Assertion (A) is true, but Reason (R) is false.

**Question 19.**

If  $p$  and  $q$  are zeroes of the polynomial  $p(y) = 21y^2 - y - 2$ , then find the value of  $(1 - p)(1 - q)$ .

[2 Marks]

**Question 20.** In the given figure, three sectors of a circle of radius 5 cm make angles  $35^\circ$ ,  $50^\circ$ , and  $95^\circ$  at the centre. Find the area of the shaded region. [Use  $\pi = 22/7$ ]

[2 Marks]

**Question 21.**

If  $\tan A = \sqrt{3}$ , where  $A$  is an acute angle, then find the value of  $\sin^2 A / 1 + \cos^2 A$

[2 Marks]

**Question 22.**

In the given figure,  $D$  is a point on side  $BC$  of  $\triangle ABC$  such that  $\angle ADC = \angle BAC$ . Show that  $CA^2 = CD \cdot CB$ .

[2 Marks]

**Question 23.**

In the given figure,  $OA \cdot OB = OC \cdot OD$ . Show that  $\angle A = \angle C$  and  $\angle B = \angle D$ .

[2 Marks]

**Question 24.** At point  $A$  on the diameter  $AB$  of a circle of radius 10 cm, tangent  $XAY$  is drawn to the circle. Find the length of the chord  $CD$  parallel to  $XY$  at a distance of 16 cm from  $A$ .

[2 Marks]

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## Section C

**Question 25.** Prove that the parallelogram circumscribing a circle is a rhombus.

[3 Marks]

**Question 26.** Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

[3 Marks]

**Question 27.**

Prove that :  $(1 + 1/\tan^2\theta)(1 + 1/\cot^2\theta) = 1/\sin^2\theta - \sin^4\theta$

[3 Marks]

**Question 28.**

Prove that :  $\sqrt{\operatorname{cosec}\theta} - 1/\sqrt{\operatorname{cosec}\theta} + 1 + \sqrt{\operatorname{cosec}\theta} + 1/\sqrt{\operatorname{cosec}\theta} - 1 = 2\sec\theta$

[3 Marks]

**Question 29.** If the mid-point of the line segment joining the points A(3, 4) and B(k, 6) is P(x, y) and  $x + y - 10 = 0$ , then find the value of k.

[3 Marks]

**Question 30.** The length of the hour hand of a clock is 10 cm. Find the area of the minor sector swept by the hour hand of the clock between 5 a.m. to 8 a.m. Also, find the area of the major sector.

[3 Marks]

**Question 31.**

Prove that  $\sqrt{3}$  is an irrational number.

[3 Marks]

**Question 32.**

A sum of ₹ 2,000 is invested at 7% per annum simple interest. Calculate the interests at the end of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year. Do these interests form an AP? If so, find the interest at the end of the 27th year.

[3 Marks]

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## Section D

**Question 33.**

A school is organizing a grand cultural event to show the talent of its students. To accommodate the guests, the school plans to rent chairs and tables from a local supplier. It finds that rent for each chair is ₹50 and for each table is ₹200. The school spends ₹30,000 for renting the chairs and tables. Also, the total number of items (chairs and tables) rented are 300.

If the school 'x' chairs and 'y' tables, answer the following questions:

(1) Find the number of chairs and number of tables rented by the school.

[2 Marks]

(2) What is maximum number of tables that can be rented in ₹30,000 if no chairs are rented?

[1 Marks]

(3) Write down the pair of linear equations representing the given information.

[1 Marks]

(4)

If the school wants to spend a maximum of Rs 27,000 on 300 items (tables and chairs), then find the number of chairs and tables it can rent.

[2 Marks]

## Section E

### Question 34.

Two ships are sailing in the sea on either side of a lighthouse. The angles of depression to the two ships as observed from the top of the lighthouse are  $60^\circ$  and  $45^\circ$ , respectively. If the distance between the ships is  $100(1 + \sqrt{3} / \sqrt{3})$  m, then find the height of the lighthouse.

[5 Marks]

**Question 35.** The angles of depression of the top and the bottom of an 8 m tall building from the top of another multistoried building are  $30^\circ$  and  $45^\circ$ , respectively. Find the height of the multistoried building and the distance between the two buildings.

[5 Marks]

**Question 36.** The sum of the areas of two squares is  $52 \text{ cm}^2$  and difference of their perimeters is 8 cm. Find the lengths of the sides of the two squares.

[5 Marks]

**Question 37.**

The time taken by a person to travel an upward distance of 150 km was  $2\frac{1}{2}$  hours more than the time taken in the downward return journey. If he returned at a speed of 10 km/h more than the speed while going up, find the speeds in each direction.

[5 Marks]

**Question 38.**

Prove that a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points divides the other two sides in the same ratio. Hence, in the figure given below, prove that  $\frac{AM}{MB} = \frac{AN}{ND}$  where  $LM \parallel CB$  and  $LN \parallel CD$ .

[5 Marks]

**Question 39.**

Find the Mean and Mode of the following frequency distribution:

[5 Marks]

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