CBSE EXAMINATION PAPER-2025

MATHEMATICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 88

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **44 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 3** are case based questions

iv. **Section B** – questions number **4 to 23** are multiple choice questions

v. **Section C** – questions number **24 to 30** are very short answer

vi. **Section D** – questions number **31 to 38** are short answer

vii. **Section E** – questions number **39 to 44** are long answer

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

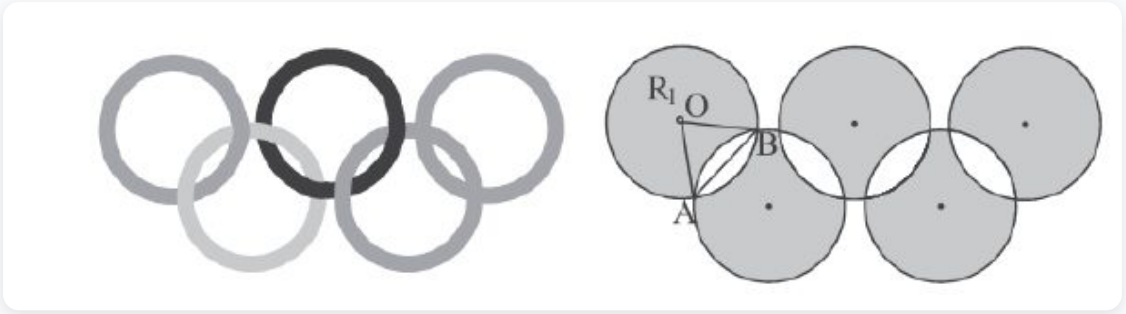
Question 1.

The Olympic symbol comprising five interlocking rings represents the union of the five continents of the world and the meeting of athletes from all over the world at the Olympic games. In order to spread awareness about Olympic games, students of Class-X took part in various activities organised by the school. One such group of students made 5 circular rings

in the school lawn with the help of ropes. Each circular ring required 44 m of rope.

Also, in the shaded regions as shown in the figure, students made rangoli showcasing various sports and games. It is given that ΔOAB is an equilateral triangle and all unshaded regions are congruent.

Based on above information, answer the following questions :



(1)

Find the radius of each circular ring.

[1 Marks]

(2)

What is the measure of ∠AOB ?

[1 Marks]

(3)

Find the area of shaded region R_1.

[2 Marks]

(4)

Find the length of rope around the unshaded regions.

[2 Marks]

Question 2.

Cable cars at hill stations are one of the major tourist attractions. On a hill station, the length of cable car ride from base point to top most point on the hill is 5000 m. Poles are

installed at equal intervals on the way to provide support to the cables on which car moves. The distance of first pole from base point is 200 m and subsequent poles are installed at equal interval of 150 m. Further, the distance of last pole from the top is 300 m.

Based on above information, answer the following questions using Arithmetic Progression :



(1)

Find the distance of 10^{th} pole from the base.

[1 Marks]

(2)

Find the distance between 15^{th} pole and 25^{th} pole.

[1 Marks]

(3)

Find the time taken by cable car to reach 15^{th} pole from the top if it is moving at the speed of 5m/sec and coming from top.

[2 Marks]

(4)

Find the total number of poles installed along the entire journey.

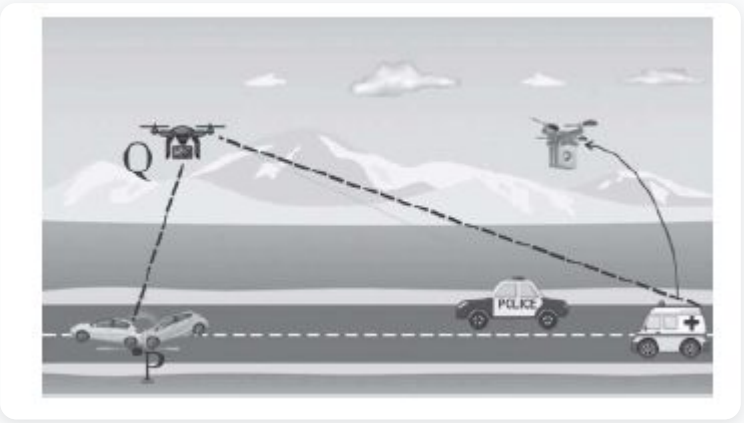
[2 Marks]

Question 3.

A drone was used to facilitate movement of an ambulance on the

straight highway to a point P on the ground where there was an accident. The ambulance was travelling at the speed of 60 km/h. The drone stopped at a point Q, 100 m vertically above the point P. The angle of depression of the ambulance was found to be 30° at a particular instant.

Based on above information, answer the following questions :



(1)

Represent the above situation with the help of a diagram.

[1 Marks]

(2)

Find the distance between the ambulance and the site of accident (P)at the particular instant. (Use√3= 1.73)

[1 Marks]

(3)

Find the time (in seconds) in which the angle of depression changes from 30° to 45°.

[2 Marks]

(4)

How long (in seconds) will the ambulance take to reach point P from a point T on the highway such that angle of depression of the ambulance at T is 60° from the drone ?

[2 Marks]

Section B

Question 4.

If $x = ab^3$ and $y = a^3b$, where a and b are prime numbers, then [HCF (x, y) — LCM (x, y)] is equal to :

[1 Marks]

(A) $1-a^3b^3$

(B) $ab-a^4b^4$

(C) ab (1 —ab)

(D) ab (1 —ab) (1 + ab)

Question 5.

$(1 + \sqrt{3})^2-(1-\sqrt{3})^2$ is :

[1 Marks]

(A) a negative integer

(B) a positive rational number

(C) a positive irrational number

(D) a negative irrational number

Question 6.

The value of 'a' for which $ax^2+ x+a=0$ has equal and positive roots is:

[1 Marks]

(A) 2

(B) -1/2

(C) -2

(D) 1/2

Question 7. The distance of a point A from x-axis is 3 units. which of the following cannot be coordinates of the point A?

[1 Marks]

(A) (3,1)

(B) (-3,-3)

(C) (1,3)

(D) (-3,3)

Question 8.

The number of red balls in a bag is 10 more than the number of black balls. if the probability of drawing a red ball at random from this bag is 3/5, then the total number of balls in the bag is :

[1 Marks]

(A) 60

(B) 50

(C) 40

(D) 80

Question 9. The value of 'p' for which the equations px + 3y = p - 3 12x + py = p has infinitely many solutions is:

[1 Marks]

(A) ±6

(B) 6 only

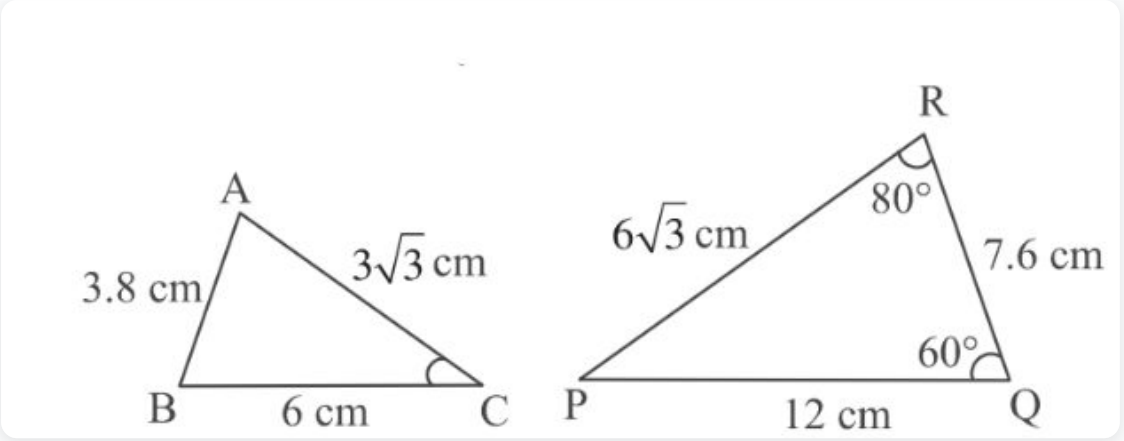
(C) Any real number except ±6

(D) -6 only

Question 10.

ΔABC and ΔPQR are shown in the adjoining figures. The measure of C is:

[1 Marks]



(A) 80°

(B) 40°

(C) 140°

(D) 60°

Question 11.

tan 2 A = 3 tan A is true, when the measures of ∠ A is :

[1 Marks]

(A) 45°

(B) 60°

(C) 30°

(D) 90°

Question 12. Which of the following statement is true?

[1 Marks]

(A) cos 20°> cos 70°

(B) sin 20° > cos 20°

(C) sin 20° > sin 70°

(D) tan 20° > tan 70°

Question 13.

A 30 m long rope is tightly stretched and tied from the top of pole to the ground. If the rope makes an angle of 60° with the ground, the height of the pole is :

[1 Marks]

(A) $10\sqrt{3}$m

(B) $30\sqrt{3}$m

(C) $15\sqrt{3}$m

(D) 15m

Question 14.

On the top face of the wooden cube of side 7 cm, hemispherical depressions of radius 0.35 cm are to be formed by taking out the wood. The maximum number of depressions that can be formed is :

[1 Marks]

(A) 10

(B) 400

(C) 20

(D) 100

Question 15.

The cumulative frequency for calculating median is obtained by adding the frequencies of all the :

[1 Marks]

(A) classes preceding the median class

(B) classes following the median class

(C) classes up to the median class

(D) all classes

Question 16.

If mean and median of given set of observations are 10 and 11 respectively, then the value of mode is :

[1 Marks]

(A) 21

(B) 13

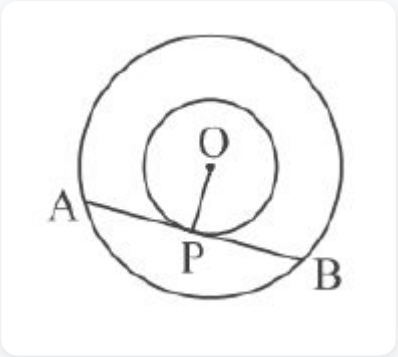
(C) 10.5

(D) 8

Question 17.

In the adjoining figure, AB is the chord of the larger circle touching the smaller circle. The centre of both the circles is O. If AB =2 r and OP =r, then the radius of larger circle is :

[1 Marks]



(A) 2r

(B) 3r

(C) 2√2r

(D) √2r

Question 18.

A parallelogram having one of its sides 5 cm circumscribes a circle. The perimeter of parallelogram is :

[1 Marks]

(A) 40 cm

(B) less than 20 cm

(C) 20 cm

(D) more than 20 cm but less than 40 cm

Question 19.

E and F are points on the sides AB and AC respectively of a ΔABC such that AE/EB=AF/FC=1/2. Which of the following relation is true ?

[1 Marks]

(A) BC=3EF

(B) EF=2BC

(C) BC=2EF

(D) EF=3BC

Question 20. Which of the following statements is true for a polynomial p(x) of degree 3?

[1 Marks]

(A) p(x) has at most two distinct zeroes.

(B) p(x) has at most three distinct zeroes.

(C) p(x) has at least two distinct zeroes.

(D) p(x) has exactly three distinct zeroes.

Question 21.

A pair of dice is thrown. The probability that sum of numbers appearing on top faces is at most 10 is :

[1 Marks]

(A) 1/11

(B) 10/11

(C) 11/12

(D) 5/6

Question 22.

Assertion (A) : 4^n ends with digit 0 for some natural number n.

Reason (R): For a number 'x' having 2 and 5 as its prime factors, x^n always ends with digit 0 for every natural number n.

[1 Marks]

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

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

(C) Assertion (A) is false but Reason (R) is true.

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

Question 23.

Assertion (A) : Tangents drawn at the end points of a diameter of a circle are always parallel to each other.

Reason (R) : The lengths of tangents drawn to a circle from a point outside the circle are always equal.

[1 Marks]

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

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

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

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

Section C

Question 24.

Solve the following system of equations algebraically: $30x+44y=10$; $40x+55y=13$

[2 Marks]

Question 25.

A 1.5 m tall boy is walking away from the base of a lamp post which is 12 m high, at the speed of 2.5 m/sec. Find the length of his shadow after 3 seconds.

[2 Marks]

Question 26.

In parallelogram ABCD, side AD is produced to E and BE intersects CD at F. Prove that $\Delta ABE \sim \Delta CFB$.

[2 Marks]

Question 27.

Find the coordinates of the point C which lies on the line AB produced such that AC = 2BC, where coordinates of points A and B are (- 1, 7) and (4, — 3) respectively.

[2 Marks]

Question 28.

Find value of x for which $(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = x + \tan^2 A + \cot^2 A$.

[2 Marks]

Question 29.

Evaluate the following : $3 \sin 30° - 4 \sin^3 30° / 2 \sin^2 50° + 2 \cos^2 50°$

[2 Marks]

Question 30.

Two friends Anil and Ashraf were born in December month in the year 2010. Find the probability that:

(i) they share the same date of birth.

(ii) they have different dates of birth.

[2 Marks]

Section D

Question 31.

Prove that $\sqrt{2}$ is an irrational number.

[3 Marks]

Question 32. The monthly incomes of two persons are in the ratio 9:7 and their monthly expenditures are in the ratio 4:3. If each saved Rs 5,000, express the given situation algebraically as a system of linear equations in two variables. Hence, find their respective monthly incomes.

[3 Marks]

Question 33.

P(x,y), Q(-2, -3), and R(2, 3) are vertices of a right triangle PQR right angled at P. Find the relationship between x and y. Hence, find all possible values of x for which y =2.

[3 Marks]

Question 34.

Prove that cos A + sin A -1 / cos A- sinA+1=cosec A -cot A

[3 Marks]

Question 35.

α and β are zeroes of the quadratic polynomial $px^2 + qx + 1$. Form a quadratic polynomial whose zeroes are 2/α and 2/β.

[3 Marks]

Question 36. Rectangle ABCD circumscribes a circle of radius 10 cm. Prove that ABCD is a square. Hence, find the perimeter of ABCD.

[3 Marks]

Question 37.

Let x and y be two distinct prime numbers and $p = x^2 y^3$, $q = xy^4$, $r = x^5 y^2$. Find the HCF and LCM of p, q and r. Further check if HCF(p, q, r) × LCM(p, q, r) = p × q × r or not.

[3 Marks]

Question 38.

If cotθ+cosθ = p and cotθ—cosθ =q,

prove that $p^2 — q^2 = 4\sqrt{pq}$

[3 Marks]

Section E

Question 39. The sides of a right triangle are such that the longest side is 4 m more than the shortest side and the third side is 2 m less than the longest side. Find the length of each side of the triangle. Also, find the difference between the numerical values of the area and the perimeter of the given triangle.

[5 Marks]

Question 40.

Express the equation x-2/x-3 + x-4/x-5 = 10/3;(x ≠3,5)as a quadratic equation in standard form. Hence, find the roots of the equation so formed.

[5 Marks]

Question 41.

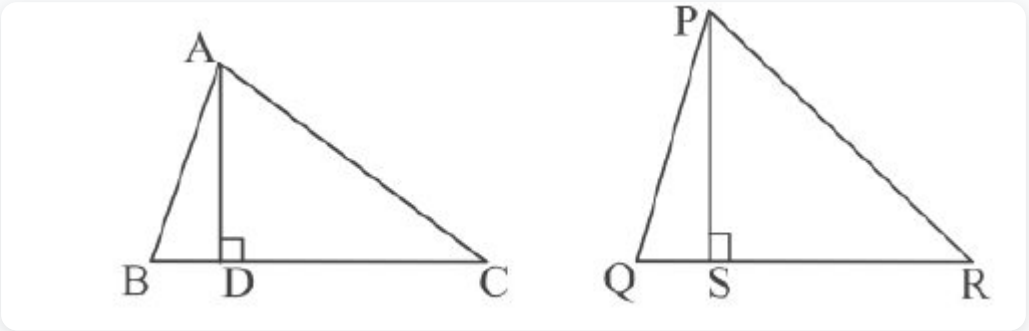
The corresponding sides of ΔABC and Δ PQR are in the ratio 3 : 5. AD⊥BC and PS⊥QR as shown in the following figures :

(i) Prove that ΔADC ~ ΔPSR

(ii) If AD =4 cm, find the length of PS.

(iii) Using (ii) find ar (ΔABC) : ar (PQΔR)

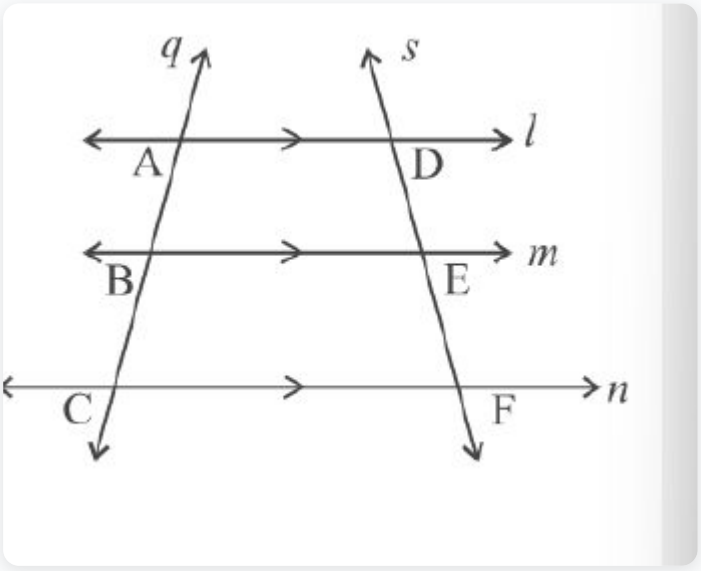
[5 Marks]



Question 42.

State basic proportionality theorem. Use it to prove the following: If three parallel lines l, m, n are intersected by transversals p and q as shown in the adjoining figure, then AB/BC = DE/EF.

[5 Marks]



Question 43.

wooden cubical die is formed by forming hemispherical depressions on each face of the cube such that face 1 has one depression, face 2 has two depressions and so on. The sum of number of

hemispherical depressions on opposite faces is always 7. If the edge of the cubical die measures 5 cm

and each hemispherical depression is of diameter 1.4 cm, find the total surface area of the die so formed.

[5 Marks]

Question 44.

The following table shows the number of patients of different age group who were discharged from the hospital in a particular month :

Find the ‘mean’ and the ‘mode’ of the above data.

[5 Marks]

Age (in years)	Number of Patients Discharged
5-15	6
15-25	11
25-35	21
35-45	23
45-55	14
55-65	5
Total	**80**