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MATHEMATICS

STANDARD
CBSE

CLASS X

SESSION 2026-27

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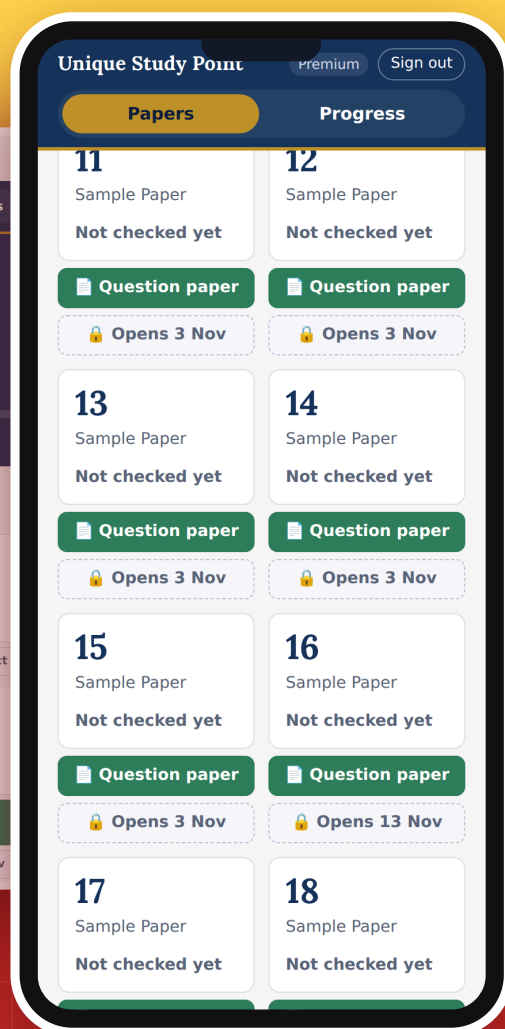
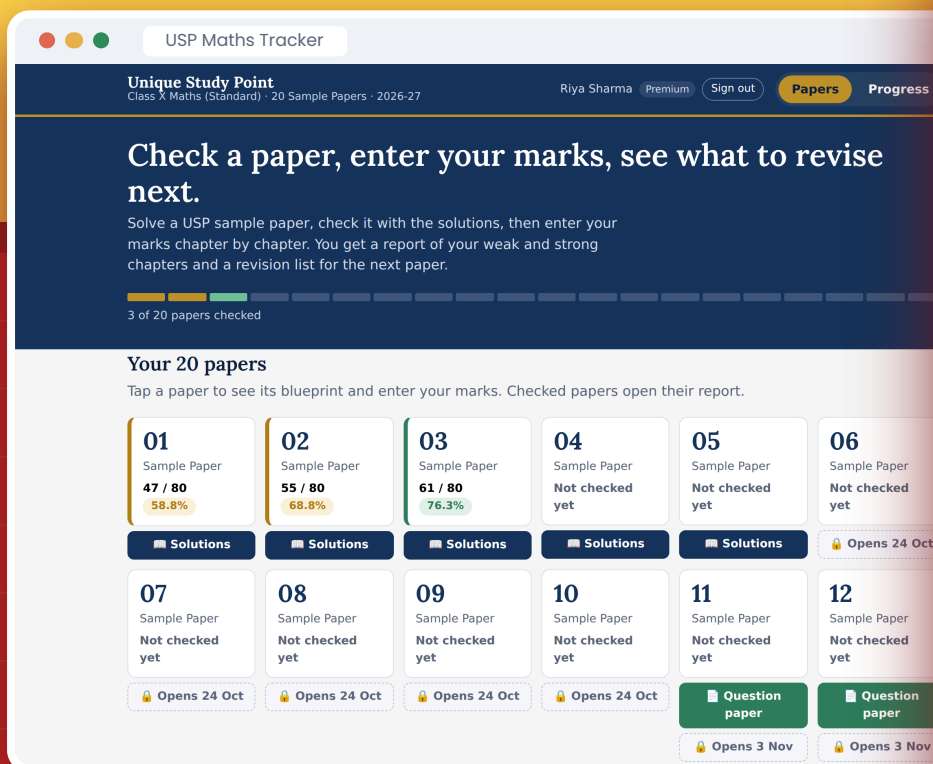
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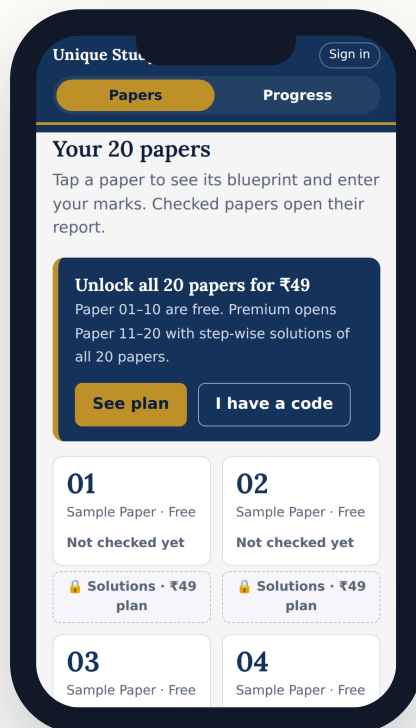
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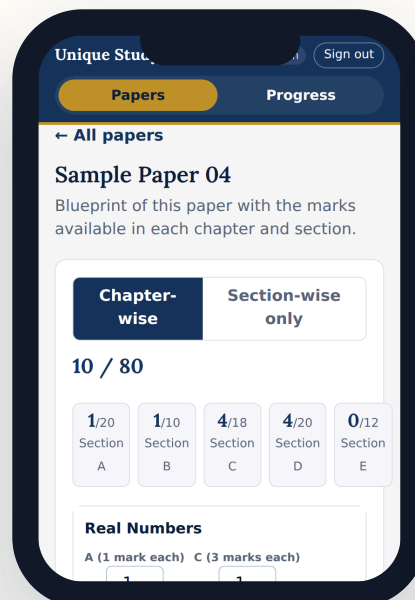
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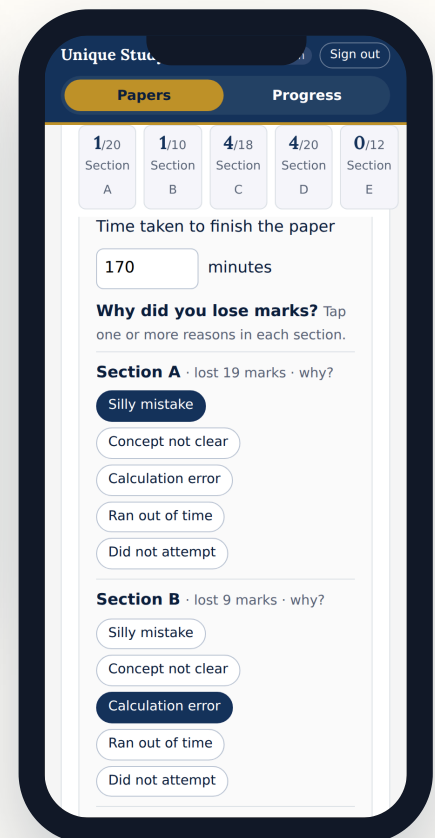
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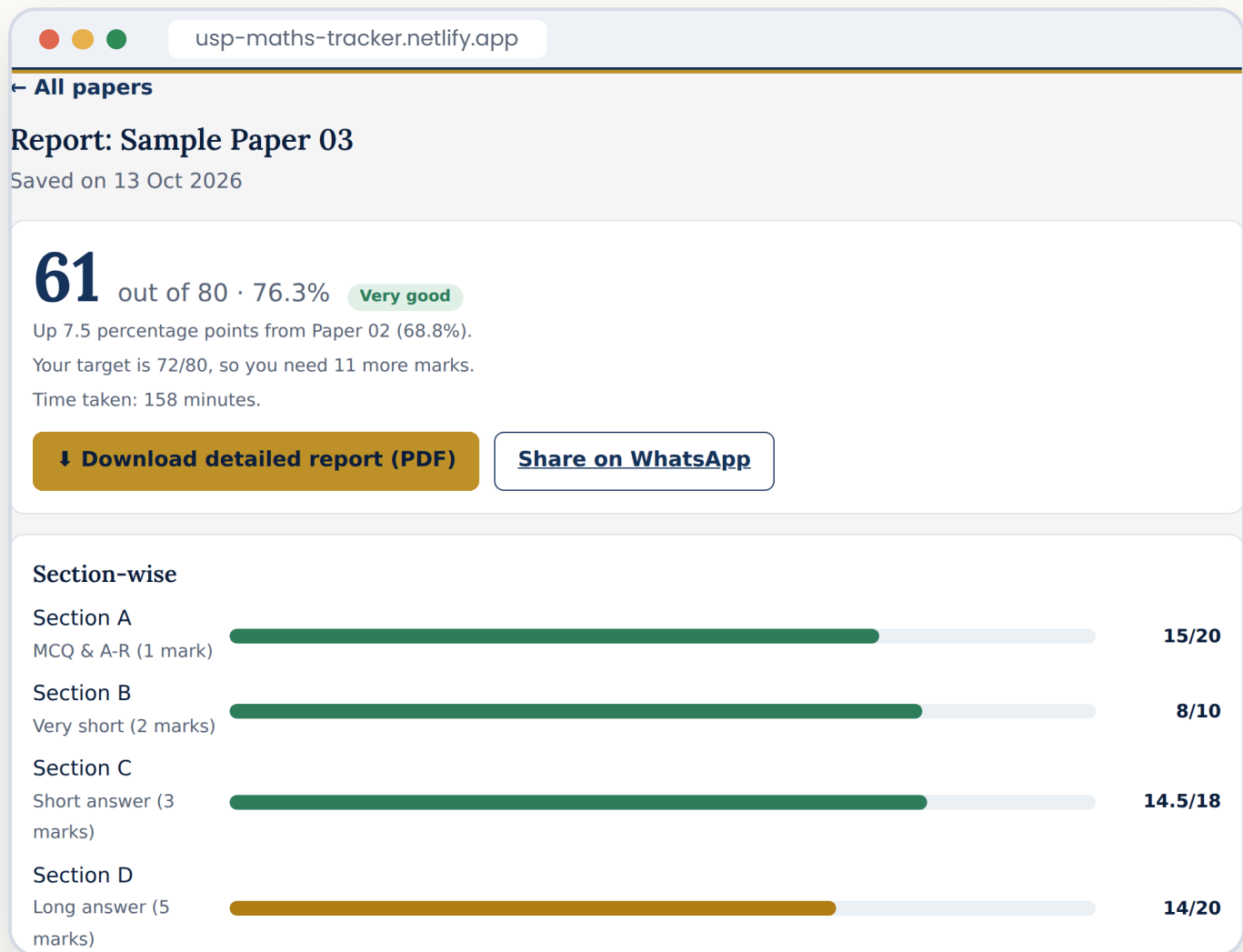
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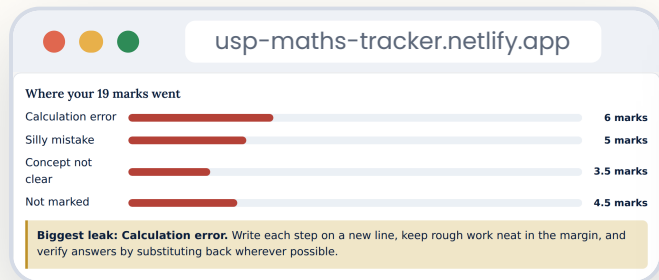
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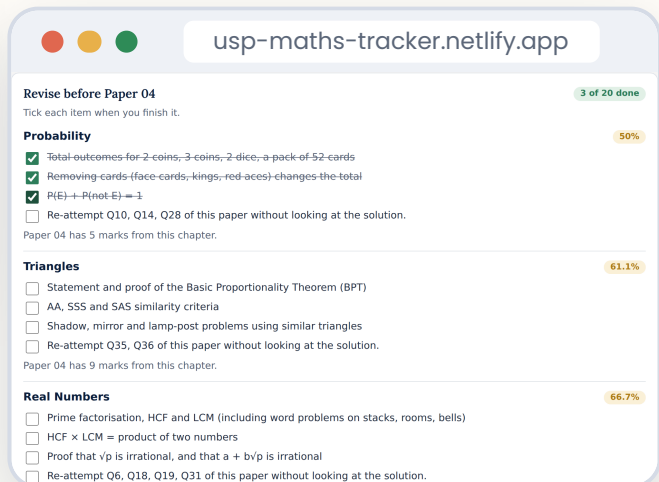
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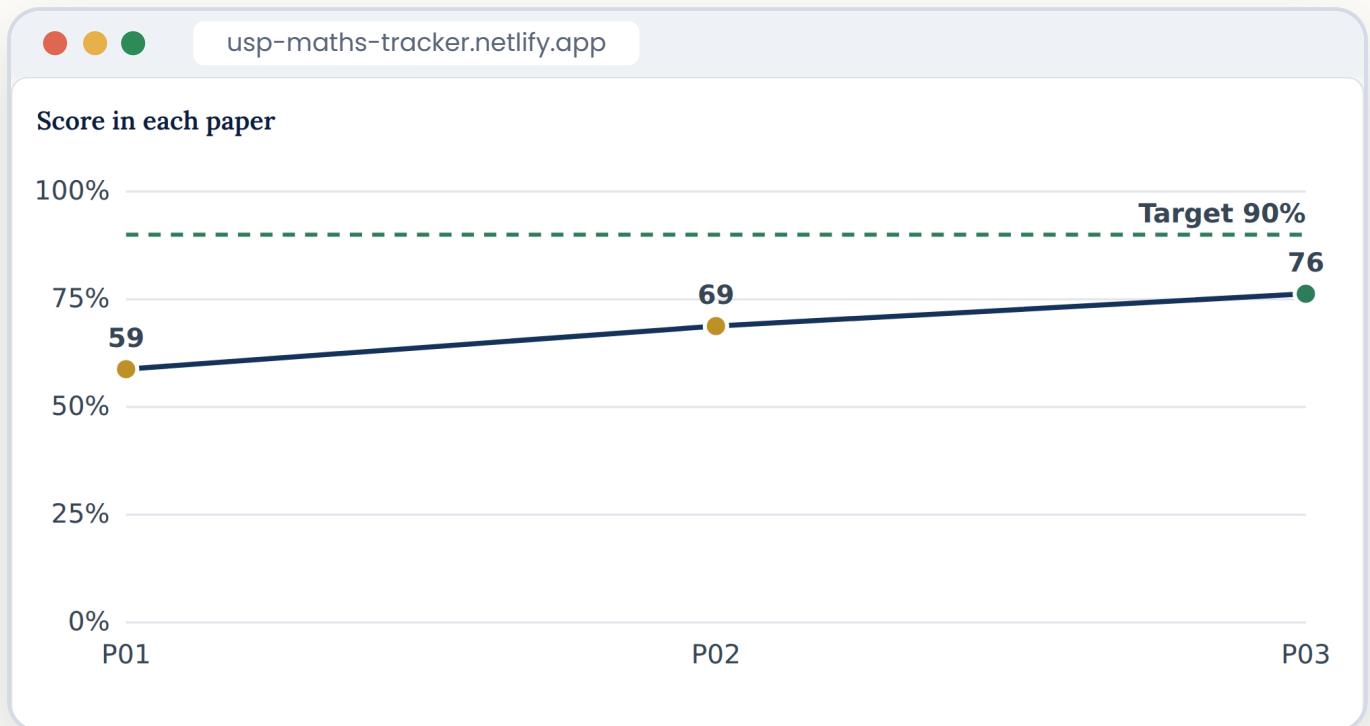


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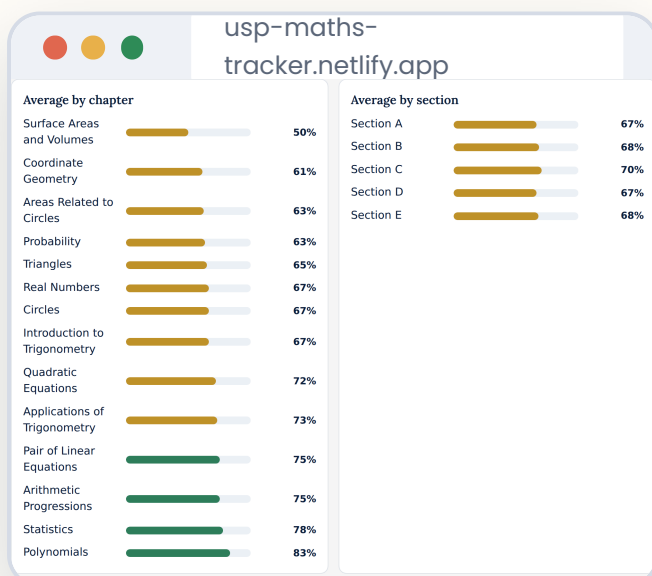


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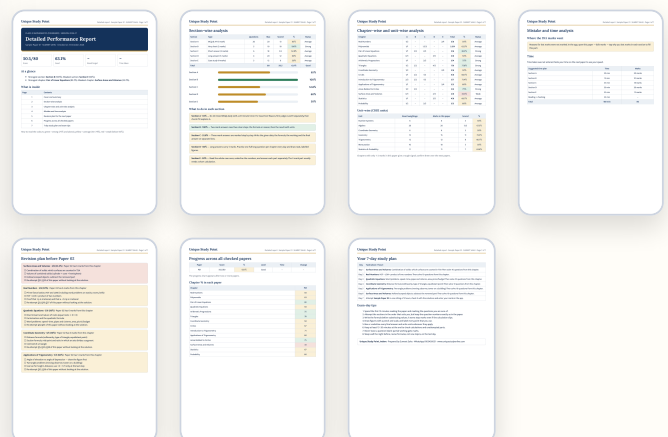
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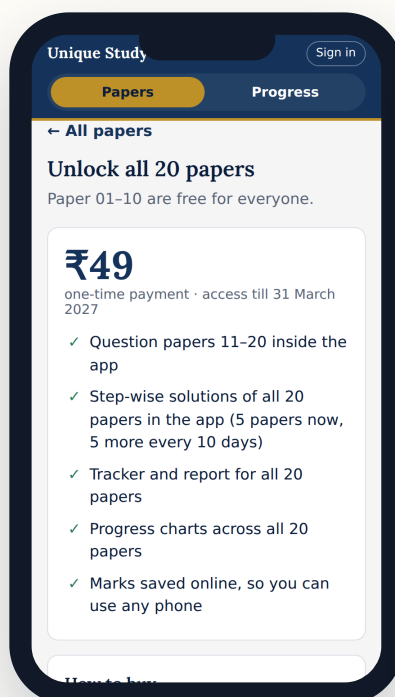


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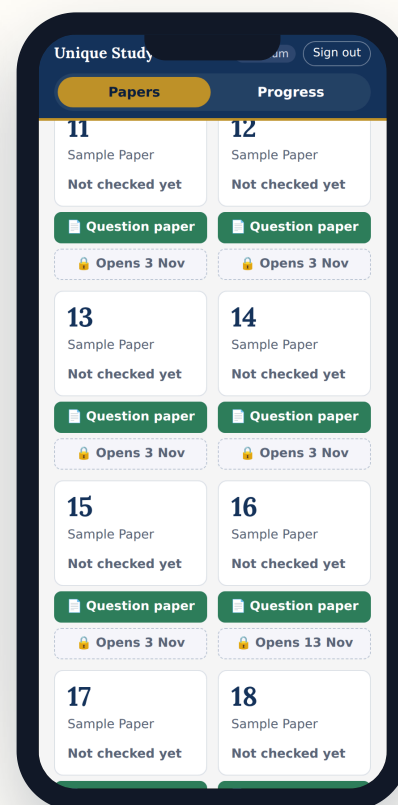
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Plan page



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SAMPLE PAPER 01 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	2	–	–	–	4	6
Polynomials	1	–	3	–	–	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	1	–	3	–	–	4
Triangles	2	2	–	5	–	9
Coordinate Geometry	2	–	–	–	4	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	1	–	–	–	4	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 01**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub-parts of 1, 1 and 2 marks.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in the 2-mark sub-part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. If a, b are the zeroes of the polynomial $x^2 - 6x + 8$, then the value of $(a + b)$ is:

(a) 6 (b) 8

(c) –6 (d) 2

2. If $x \tan 60^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$, then $x =$

(a) $\cos 30^\circ$ (b) $\tan 30^\circ$

(c) $\sin 30^\circ$ (d) $\cot 30^\circ$

3. If two positive integers p and q can be expressed as $p = 12a^3b^2$ and $q = 18a^2b^4$, where a and b are prime numbers, then $\text{LCM}(p, q)$ is:

- (a) $6a^2b^2$ (b) $216a^5b^6$
(c) $36a^3b^4$ (d) $36a^2b^2$

4. If the quadratic equation $ax^2 + bx + c = 0$ has two real and equal roots, then c is equal to

- (a) $-\frac{b}{2a}$ (b) $\frac{b}{2a}$
(c) $-\frac{b^2}{4a}$ (d) $\frac{b^2}{4a}$

5. The centre of a circle is at $(-1, 2)$. If one end of a diameter is at $(4, 5)$, then the other end is at:

- (a) $(1.5, 3.5)$ (b) $(-5, -1)$
(c) $(-6, 1)$ (d) $(-6, -1)$

6. The pair of linear equations $3x = 4y + 5$ and $12y = 9x - 20$ represents two lines which are:

- (a) intersecting (b) parallel
(c) coincident (d) either intersecting or parallel

7. $\sec \theta$ when expressed in terms of $\cot \theta$ is equal to:

- (a) $\frac{1 + \cot^2 \theta}{\cot \theta}$ (b) $\sqrt{1 + \cot^2 \theta}$
(c) $\frac{\sqrt{1 + \cot^2 \theta}}{\cot \theta}$ (d) $\frac{\sqrt{1 - \cot^2 \theta}}{\cot \theta}$

8. If $\triangle PQR \sim \triangle ABC$; $PQ = 10$ cm, $AB = 15$ cm and the perimeter of $\triangle ABC$ is 54 cm, then the perimeter of $\triangle PQR$ is

- (a) 81 cm (b) 24 cm
(c) 36 cm (d) 45 cm

9. What is the area of a semi-circle of diameter d ?

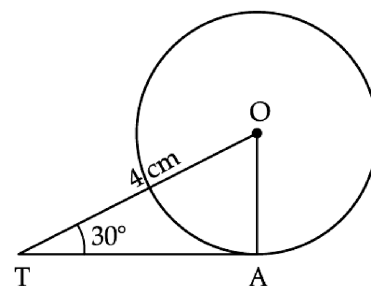
- (a) $\frac{1}{16}\pi d^2$ (b) $\frac{1}{4}\pi d^2$
(c) $\frac{1}{8}\pi d^2$ (d) $\frac{1}{2}\pi d^2$

10. $\triangle ABC \sim \triangle PQR$. If AM and PN are altitudes of $\triangle ABC$ and $\triangle PQR$ respectively and $AB^2 : PQ^2 = 16 : 25$, then $AM : PN =$

- (a) 4 : 5 (b) 16 : 25
(c) 5 : 4 (d) 256 : 625

11. In the given figure, TA is a tangent to the circle with centre O such that $OT = 4$ cm, $\angle OTA = 30^\circ$. Then the length of TA is:

- (a) $2\sqrt{3}$ cm (b) 2 cm
(c) $2\sqrt{2}$ cm (d) 3 cm



12. The volume of a right circular cone whose area of the base is 144 cm^2 and the vertical height is 9 cm, is:

- (a) 1296 cm^3 (b) 864 cm^3
(c) 288 cm^3 (d) 432 cm^3

13. For some data $x_1, x_2, \dots, x_n$ with respective frequencies $f_1, f_2, \dots, f_n$, the value of $\sum_{i=1}^n f_i(x_i - \bar{x})$ is equal to:

- (a) $n\bar{x}$ (b) 1
(c) $\sum f_i$ (d) 0

14. A bag contains 4 pink, 7 blue and 9 yellow balls. One ball is drawn at random from the bag. What is the probability of getting neither a blue nor a pink ball?

- (a) $\frac{11}{20}$ (b) $\frac{9}{20}$
(c) $\frac{7}{20}$ (d) $\frac{1}{5}$

15. The angle of elevation of the top of a tower from a point on the ground, 30 m away from its foot, is 30° . The height of the tower is

- (a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m
(c) 15 m (d) 30 m

16. The 15th term of the A.P. 4, 9, 14, ... is

- (a) 69 (b) 79
(c) 74 (d) 70

17. The area of the circle that can be inscribed in a square of 6 cm is

- (a) $36\pi \text{ cm}^2$ (b) $18\pi \text{ cm}^2$
(c) $12\pi \text{ cm}^2$ (d) $9\pi \text{ cm}^2$

18. A die is thrown once. The probability of getting a prime number is

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$
(c) $\frac{2}{3}$ (d) $\frac{1}{6}$

19. **Assertion (A):** If the product of two numbers is 3750 and their HCF is 25, then their LCM is 150.

Reason (R): HCF is always a factor of LCM.

- (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false (d) A is false but R is true

20. **Assertion (A):** If the co-ordinates of the mid-points of the sides AB and AC of $\triangle ABC$ are $D(4, 6)$ and $E(-1, -6)$ respectively, then $BC = 26$ units.

Reason (R): The line joining the mid-points of two sides of a triangle is parallel to the third side and equal to half of it.

- (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false (d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. Evaluate: $4\sqrt{2}\cos 45^\circ \sin 30^\circ + 2\sqrt{3}\cos 30^\circ$ [2]

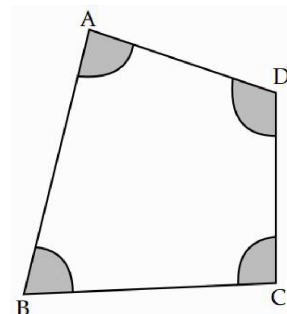
OR

If $A = 30^\circ$ and $B = 60^\circ$, verify that: $\sin(A + B) = \sin A \cos B + \cos A \sin B$.

22. The length of the minute hand of a clock is 21 cm. Find the area swept by it when it moves from 4:10 p.m. to 4:50 p.m. [2]

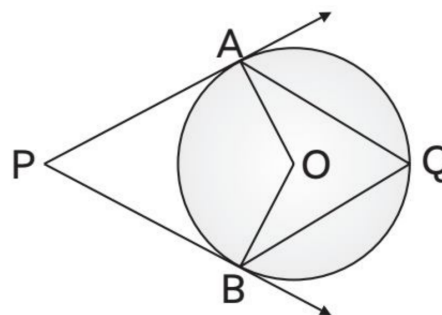
OR

In the given figure, arcs have been drawn of radius 14 cm each with vertices A, B, C and D of quadrilateral $ABCD$ as centres. Find the area of the shaded region.

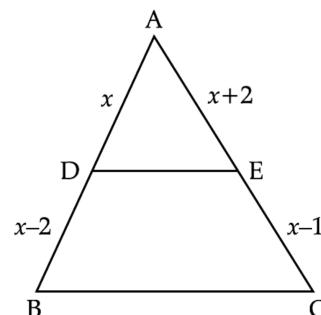


23. Solve the following system of linear equations: $7x - 2y = 12$ and $8x + 7y = 23$ and verify your answer. [2]

24. In the given figure, O is the centre of the circle. Find $\angle AQB$, given that PA and PB are tangents to the circle and $\angle APB = 64^\circ$. [2]



25. In the given figure, ABC is a triangle in which $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, then find the value of x . [2]



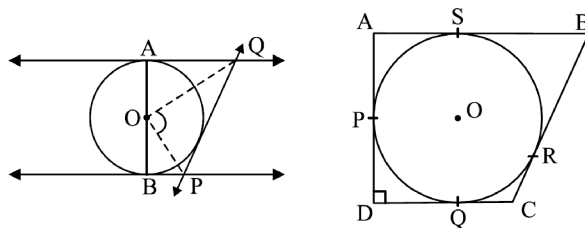
SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA-II) questions of 3 marks each.

26. How many terms of the A.P. $9, 17, 25, \dots$ must be taken to give a sum of 636? [3]
27. Prove that: $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \csc \theta$. [3]

28. In the figure given below (left), AB is a diameter of the circle with centre O . AQ , BP and PQ are tangents to the circle. Prove that $\angle POQ = 90^\circ$. [3]



OR

A circle with centre O and radius 6 cm is inscribed in a quadrilateral $ABCD$ in which P , Q , R , S are the points of contact as shown in the right-hand figure. If AD is perpendicular to DC , $BC = 15$ cm and $BS = 12$ cm, then find the length DC .

29. Two coins are tossed simultaneously. What is the probability of getting (i) at least one head? (ii) at most one tail? (iii) a head and a tail? [3]

30. If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of the polynomial $2x^2 - 7x - 4$, then find the values of p and q . [3]

31. Four years ago, Rashmi was thrice as old as Nazma. Ten years later, Rashmi will be twice as old as Nazma. How old are Rashmi and Nazma now? [3]

OR

Anuj had some chocolates, and he divided them into two lots A and B . He sold the first lot at the rate of Rs. 2 for 3 chocolates and the second lot at the rate of Rs. 1 per chocolate, and got a total of Rs. 460. If he had sold the first lot at the rate of Rs. 1 per chocolate, and the second lot at the rate of Rs. 4 for 5 chocolates, his total collection would have been Rs. 480. Find the total number of chocolates he had.

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model. [5]

OR

There are two identical solid cubical boxes of side 14 cm. From the top face of the first cube a hemisphere of diameter equal to the side of the cube is scooped out. This hemisphere is inverted and placed on the top of the second cube's surface to form a dome. Find (i) the ratio of the total surface areas of the two new solids formed, (ii) the volume of each new solid formed.

33. To fill a swimming pool two pipes are used. If the pipe of larger diameter is 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 20 hours more than the pipe of larger diameter to fill the pool. [5]

OR

In a flight of 900 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 150 km/h from its usual speed and the time of the flight increased by 30 min. Find the scheduled duration of the flight.

34. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. [5]

35. The median of the following data is 550. Find the values of x and y , if the total frequency is 100. [5]

Class	0–100	100–200	200–300	300–400	400–500	500–600	600–700	700–800	800–900	900–1000
Frequency	2	5	x	12	17	20	y	9	7	4

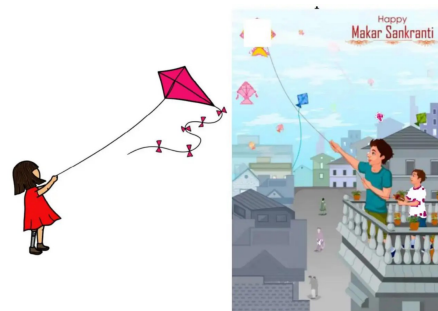
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (Kite Festival):

The kite festival is a popular festival in India which takes place during Makar Sankranti. People fly kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. The height of Reena's kite is 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is 30° . Ravi is flying a kite from a 10 m high building. His kite is also flying 60 m above the ground and the length of the string used by Ravi is the same as that of Reena's. θ is the angle of elevation of Ravi's kite from a point on the rooftop. (Take $\sqrt{3} = 1.73$)



- Find the length of the string used by Reena. [1]
- Find the value of $\sin \theta$. [1]
- (a) If θ changes to 60° without changing the length of the string, what will be the height of Ravi's kite above the ground? [2]

OR

(iii) (b) What would have been the height of Ravi's kite above the ground if the string had an inclination of 30° with the horizontal (the length of the string remaining the same)?

37. Case Study – 2 (Book Giving Day):

February 14 is celebrated as International Book Giving Day and many countries in the world celebrate this day. Some people in India also started celebrating this day and donated the following number of books of various subjects to a public library: History = 96, Science = 240, Mathematics = 336. These books have to be arranged in the minimum number of stacks such that each stack contains books of only one subject and the number of books in each stack is the same.

- (i) How many books are arranged in each stack? [1]
- (ii) How many stacks are used to arrange all the Mathematics books? [1]
- (iii) (a) Determine the total number of stacks that will be used for arranging all the books. [2]

OR

(iii) (b) If the thickness of each book of History, Science and Mathematics is 1.8 cm, 2.2 cm and 2.5 cm respectively, then find the height of each stack of History, Science and Mathematics books.

38. Case Study – 3 (No Smoking Campaign):

To raise social awareness about the hazards of smoking, a school decided to start a 'No Smoking' campaign. 10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of one of the triangles are $P(-3, 4)$, $Q(3, 4)$ and $R(-2, -1)$.



- (i) What are the coordinates of the centroid of $\triangle PQR$? [1]
- (ii) If T is the mid-point of the line joining R and Q , what are the coordinates of T ? [1]
- (iii) (a) If U is the mid-point of the line joining R and P , what are the coordinates of U ? [2]

OR

(iii) (b) If S is the mid-point of the line joining P and Q , what are the coordinates of the centroid of $\triangle STU$?

———— All the Best ————

CHAPTER-WISE QUESTION INDEX

Find out which question numbers belong to which chapter

How to use this page

1. Solve the paper and check your answers with the solutions.
2. Pick a chapter from the table below and add up the marks you got in *only* the questions listed for that chapter.
3. Write that total in the Performance Tracker (next page). The chapters where you score low are the ones to revise first.

Question numbers of each chapter (Section-wise)

Chapter	A 1 mark each	B 2 marks	C 3 marks	D 5 marks	E 4 marks	Total marks
Real Numbers	3, 19	–	–	–	37	6
Polynomials	1	–	30	–	–	4
Pair of Linear Equations	6	23	31	–	–	6
Quadratic Equations	4	–	–	33	–	6
Arithmetic Progressions	16	–	26	–	–	4
Triangles	8, 10	25	–	34	–	9
Coordinate Geometry	5, 20	–	–	–	38	6
Circles	11	24	28	–	–	6
Introduction to Trigonometry	2, 7	21	27	–	–	7
Some Applications of Trigonometry	15	–	–	–	36	5
Areas Related to Circles	9, 17	22	–	–	–	4
Surface Areas and Volumes	12	–	–	32	–	6
Statistics	13	–	–	35	–	6
Probability	14, 18	–	29	–	–	5
All questions	1–20	21–25	26–31	32–35	36–38	80

Example – Triangles: the questions are Q.8, Q.10 (1 mark each), Q.25 (2 marks) and Q.34 (5 marks), i.e. 9 marks in all. Add the marks you got in these four questions and write the total against *Triangles* in the tracker.

Tip: a chapter in which you get less than about 60% of its marks should be revised before the next paper.

MY PERFORMANCE TRACKER

Fill this after checking your answers with the solutions

A. Section-wise Score

Section	Type of Questions	Maximum Marks	Marks Obtained
A	MCQ & Assertion-Reason	20	
B	Very Short Answer (SA-I)	10	
C	Short Answer (SA-II)	18	
D	Long Answer (LA)	20	
E	Case Study Based	12	
Total		80	

B. Chapter-wise Performance (track where you need revision)

Chapter	Marks in Paper	Marks Obtained	Revise? (✓/×)
Real Numbers	6		
Polynomials	4		
Pair of Linear Equations	6		
Quadratic Equations	6		
Arithmetic Progressions	4		
Triangles	9		
Coordinate Geometry	6		
Circles	6		
Introduction to Trigonometry	7		
Some Applications of Trigonometry	5		
Areas Related to Circles	4		
Surface Areas and Volumes	6		
Statistics	6		
Probability	5		
TOTAL	80		

My target for the next paper: / 80

Weakest chapter to revise:

SOLUTIONS – SAMPLE PAPER 01

Class X • Mathematics (Standard) • Session 2026–27 • with step marks

Section A – Answer Key (MCQ & Assertion–Reason)

Q	1	2	3	4	5	6	7	8	9	10
Ans	(a)	(b)	(c)	(d)	(d)	(b)	(c)	(c)	(c)	(a)

Q	11	12	13	14	15	16	17	18	19	20
Ans	(a)	(d)	(d)	(b)	(a)	(c)	(d)	(b)	(b)	(a)

SECTION A

Detailed answers with reasons

1. (a) 6. $x^2 - 6x + 8 = (x - 2)(x - 4)$, so the zeroes are 2 and 4.

$$a + b = 2 + 4 = 6 \text{ (also } -\frac{b}{a} = 6).$$

$$2. (b) \tan 30^\circ. \quad x \cdot \sqrt{3} \cdot \frac{1}{2} = \frac{\sqrt{3}}{2} \cdot \frac{1}{\sqrt{3}} \Rightarrow \frac{x\sqrt{3}}{2} = \frac{1}{2}.$$

$$x = \frac{1}{\sqrt{3}} = \tan 30^\circ.$$

3. (c) $36a^3b^4$. LCM of 12 and 18 is 36; take the highest powers a^3 and b^4 .

$$\text{LCM}(p, q) = 36a^3b^4.$$

$$4. (d) \frac{b^2}{4a}. \text{ Equal roots } \Rightarrow D = 0 \Rightarrow b^2 - 4ac = 0 \Rightarrow c = \frac{b^2}{4a}.$$

5. (d) $(-6, -1)$. The centre is the mid-point of the diameter. Let the other end be (x, y) .

$$\frac{x+4}{2} = -1 \Rightarrow x = -6 \text{ and } \frac{y+5}{2} = 2 \Rightarrow y = -1.$$

6. (b) parallel. The equations are $3x - 4y - 5 = 0$ and $9x - 12y - 20 = 0$.

$$\frac{a_1}{a_2} = \frac{1}{3}, \frac{b_1}{b_2} = \frac{1}{3}, \frac{c_1}{c_2} = \frac{1}{4}.$$

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}, \text{ so the lines are parallel.}$$

$$7. (c) \frac{\sqrt{1 + \cot^2 \theta}}{\cot \theta} \cdot \sec \theta = \sqrt{1 + \tan^2 \theta} = \sqrt{1 + \frac{1}{\cot^2 \theta}}.$$

$$= \frac{\sqrt{\cot^2 \theta + 1}}{\cot \theta}.$$

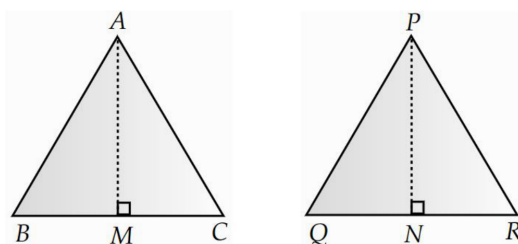
8. (c) 36 cm. Ratio of perimeters = ratio of corresponding sides.

$$\frac{\text{Perimeter of } PQR}{54} = \frac{10}{15} \Rightarrow \text{Perimeter of } PQR = 54 \times \frac{10}{15} = 36 \text{ cm.}$$

$$9. (c) \frac{1}{8}\pi d^2. \text{ Radius} = \frac{d}{2}.$$

$$\text{Area} = \frac{1}{2}\pi \left(\frac{d}{2}\right)^2 = \frac{\pi d^2}{8}.$$

$$10. (a) 4 : 5. \triangle ABC \sim \triangle PQR \Rightarrow \frac{AB}{PQ} = \frac{AM}{PN}.$$



$$\frac{AB^2}{PQ^2} = \frac{16}{25} \Rightarrow \frac{AB}{PQ} = \frac{4}{5}.$$

$$\therefore \frac{AM}{PN} = \frac{4}{5}, \text{ i.e. } AM : PN = 4 : 5.$$

11. (a) $2\sqrt{3}$ cm. $\angle OAT = 90^\circ$ (tangent $\perp$ radius).

$$\text{In } \triangle OAT: \cos 30^\circ = \frac{TA}{OT} \Rightarrow \frac{\sqrt{3}}{2} = \frac{TA}{4} \Rightarrow TA = 2\sqrt{3} \text{ cm.}$$

12. (d) 432 cm^3 . Area of base = $\pi r^2 = 144 \text{ cm}^2$.

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 144 \times 9 = 432 \text{ cm}^3.$$

13. (d) 0. $\sum f_i(x_i - \bar{x}) = \sum f_i x_i - \bar{x} \sum f_i$.

Since $\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$, this equals $\sum f_i x_i - \sum f_i x_i = 0$.

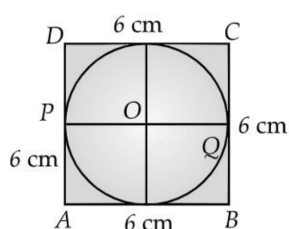
14. (b) $\frac{9}{20}$. Total balls = $4 + 7 + 9 = 20$.

Neither blue nor pink means yellow: $P = \frac{9}{20}$.

15. (a) $10\sqrt{3}$ m. $\tan 30^\circ = \frac{h}{30} \Rightarrow h = \frac{30}{\sqrt{3}} = 10\sqrt{3}$ m.

16. (c) 74. $a = 4, d = 5: a_{15} = a + 14d = 4 + 70 = 74$.

17. (d) $9\pi \text{ cm}^2$. The diameter of the inscribed circle = side of the square = 6 cm.



$r = 3 \text{ cm}$, so area = $\pi r^2 = \pi(3)^2 = 9\pi \text{ cm}^2$.

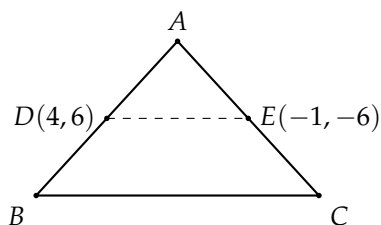
18. (b) $\frac{1}{2}$. The prime numbers on a die are 2, 3, 5 (3 outcomes out of 6).

$P = \frac{3}{6} = \frac{1}{2}$.

19. (b). $\text{HCF} \times \text{LCM} = \text{product of the numbers} \Rightarrow \text{LCM} = \frac{3750}{25} = 150$, so A is true.

R is also true, but it does not explain A (the explanation is the product formula). So the answer is (b).

20. (a). Let $D(4, 6)$ and $E(-1, -6)$ be the mid-points of AB and AC .



$DE = \sqrt{(-1 - 4)^2 + (-6 - 6)^2} = \sqrt{25 + 144} = 13$ units.

By the mid-point theorem $BC = 2 \times DE = 26$ units, so A is true.

R is the mid-point theorem, which is the correct explanation of A.

SECTION B

Detailed step-wise solutions

21. $4\sqrt{2} \cos 45^\circ \sin 30^\circ + 2\sqrt{3} \cos 30^\circ$

$$= 4\sqrt{2} \times \frac{1}{\sqrt{2}} \times \frac{1}{2} + 2\sqrt{3} \times \frac{\sqrt{3}}{2}$$

$$= 2 + 3 = 5.$$

OR LHS = $\sin(30^\circ + 60^\circ) = \sin 90^\circ = 1.$

$$\text{RHS} = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ = \frac{1}{2} \cdot \frac{1}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} = \frac{1}{4} + \frac{3}{4} = 1.$$

$\therefore \text{LHS} = \text{RHS}.$

22. In 60 minutes the minute hand moves 360° , so in 1 minute it moves 6° .

From 4:10 p.m. to 4:50 p.m. is 40 minutes $\Rightarrow \theta = 40 \times 6^\circ = 240^\circ$.

$$\text{Area swept} = \frac{240}{360} \times \pi \times 21^2 = \frac{2}{3} \times \frac{22}{7} \times 441 = 924 \text{ cm}^2.$$

OR Let the angles at A, B, C, D be $\theta_1, \theta_2, \theta_3, \theta_4$.

$$\text{Required area} = \frac{\theta_1 + \theta_2 + \theta_3 + \theta_4}{360} \times \pi \times 14^2.$$

$$\text{The angles of a quadrilateral add up to } 360^\circ, \text{ so area} = \frac{360}{360} \times \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2.$$

23. $7x - 2y = 12$...(i) and $8x + 7y = 23$...(ii)

Multiply (i) by 7 and (ii) by 2: $49x - 14y = 84$ and $16x + 14y = 46$.

$$\text{Adding: } 65x = 130 \Rightarrow x = 2.$$

$$\text{Put in (i): } 14 - 2y = 12 \Rightarrow y = 1.$$

$$\text{Verification: (ii) } 8(2) + 7(1) = 16 + 7 = 23 \checkmark$$

24. $\angle PAO = \angle PBO = 90^\circ$ (tangent $\perp$ radius).

$$\text{In quadrilateral } PAOB: \angle AOB = 360^\circ - (90^\circ + 90^\circ + 64^\circ) = 116^\circ.$$

$$\angle AQB = \frac{1}{2} \angle AOB = \frac{1}{2} \times 116^\circ = 58^\circ \text{ (angle at the remaining part of the circle is half the angle at the centre).}$$

25. By the Basic Proportionality Theorem: $\frac{AD}{DB} = \frac{AE}{EC}$.

$$\frac{x}{x-2} = \frac{x+2}{x-1} \Rightarrow x(x-1) = (x-2)(x+2).$$

$$x^2 - x = x^2 - 4 \Rightarrow x = 4.$$

SECTION C

Detailed step-wise solutions

26. $a = 9, d = 8, S_n = 636$. $\frac{n}{2}[2(9) + (n-1)8] = 636 \Rightarrow n(4n+5) = 636 \Rightarrow 4n^2 + 5n - 636 = 0$.

$$n = \frac{-5 \pm \sqrt{25 + 10176}}{8} = \frac{-5 \pm 101}{8} \Rightarrow n = 12 \text{ (the negative root is rejected).}$$

So **12 terms** must be taken.

27. $\text{LHS} = \frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta}$.

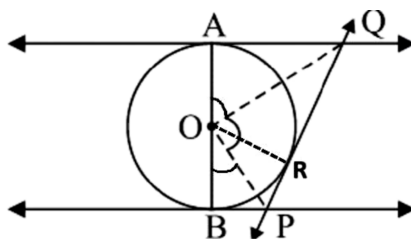
$$= \frac{\frac{\sin \theta}{\cos \theta}}{1 - \frac{\cos \theta}{\sin \theta}} + \frac{\frac{\cos \theta}{\sin \theta}}{1 - \frac{\sin \theta}{\cos \theta}} = \frac{\sin^2 \theta}{\cos \theta(\sin \theta - \cos \theta)} + \frac{\cos^2 \theta}{\sin \theta(\cos \theta - \sin \theta)}.$$

$$= \frac{1}{\sin \theta - \cos \theta} \left[\frac{\sin^2 \theta}{\cos \theta} - \frac{\cos^2 \theta}{\sin \theta} \right] = \frac{1}{\sin \theta - \cos \theta} \cdot \frac{\sin^3 \theta - \cos^3 \theta}{\sin \theta \cos \theta}.$$

$$= \frac{(\sin \theta - \cos \theta)(\sin^2 \theta + \cos^2 \theta + \sin \theta \cos \theta)}{(\sin \theta - \cos \theta) \sin \theta \cos \theta} = \frac{1 + \sin \theta \cos \theta}{\sin \theta \cos \theta}.$$

$$= \frac{1}{\sin \theta \cos \theta} + 1 = 1 + \sec \theta \csc \theta = \text{RHS. Proved.}$$

28. Join OR.



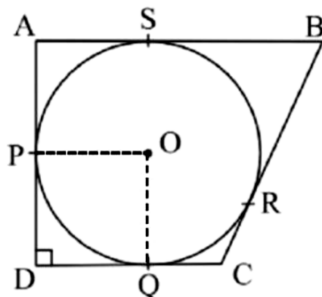
In $\triangle AOQ$ and $\triangle ROQ$: $OA = OR$ (radii), $OQ = OQ$ (common), $QA = QR$ (tangents from Q).
 $\Rightarrow \triangle AOQ \cong \triangle ROQ$ (SSS) $\Rightarrow \angle AOQ = \angle ROQ = \angle 1$.

Similarly $\triangle BOP \cong \triangle ROP \Rightarrow \angle BOP = \angle ROP = \angle 2$.

AOB is a diameter (straight line): $\angle 1 + \angle 1 + \angle 2 + \angle 2 = 180^\circ$.

$\Rightarrow \angle 1 + \angle 2 = 90^\circ$, i.e. $\angle POQ = 90^\circ$. Proved.

OR Join OP and OQ .



$BR = BS = 12$ cm (tangents from B), so $CR = BC - BR = 15 - 12 = 3$ cm.

$CQ = CR = 3$ cm (tangents from C).

$OP \perp AD$, $OQ \perp DC$ and $\angle D = 90^\circ \Rightarrow OPDQ$ is a square (as $OP = OQ = 6$ cm).

$DQ = OP = 6$ cm, so $DC = DQ + QC = 6 + 3 = 9$ cm.

29. Total outcomes = 4 (HH, HT, TH, TT).

(i) At least one head: HH, HT, TH = 3, so $P = \frac{3}{4}$.

(ii) At most one tail: HH, HT, TH = 3, so $P = \frac{3}{4}$.

(iii) A head and a tail: HT, TH = 2, so $P = \frac{2}{4} = \frac{1}{2}$.

30. Let α, β be the zeroes of $2x^2 - 7x - 4$: $\alpha + \beta = \frac{7}{2}$ and $\alpha\beta = -2$.

The zeroes of $x^2 + px + q$ are 2α and 2β .

$$2\alpha + 2\beta = -p \Rightarrow 2 \times \frac{7}{2} = -p \Rightarrow p = -7.$$

$$2\alpha \cdot 2\beta = q \Rightarrow 4\alpha\beta = q \Rightarrow q = 4 \times (-2) = -8.$$

31. Let Rashmi's age = x years and Nazma's age = y years.

$$\text{Four years ago: } x - 4 = 3(y - 4) \Rightarrow x = 3y - 8 \dots(i)$$

$$\text{Ten years later: } x + 10 = 2(y + 10) \Rightarrow x = 2y + 10 \dots(ii)$$

$$\text{From (i) and (ii): } 3y - 8 = 2y + 10 \Rightarrow y = 18, \text{ so } x = 3(18) - 8 = 46.$$

Rashmi is **46 years** old and Nazma is **18 years** old.

OR Let lot A have x chocolates and lot B have y chocolates.

$$\frac{2}{3}x + y = 460 \Rightarrow 2x + 3y = 1380 \dots(i)$$

$$x + \frac{4}{5}y = 480 \Rightarrow 5x + 4y = 2400 \dots(ii)$$

$$(i) \times 4: 8x + 12y = 5520 \quad (ii) \times 3: 15x + 12y = 7200.$$

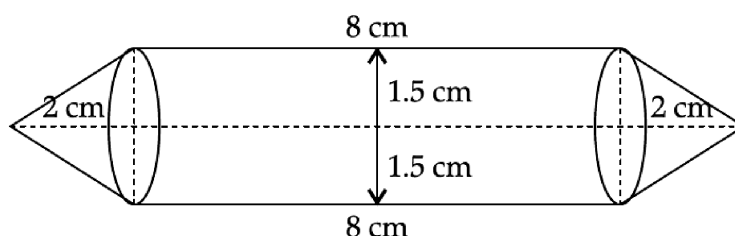
$$\text{Subtracting: } 7x = 1680 \Rightarrow x = 240; \text{ then } y = \frac{1380 - 480}{3} = 300.$$

$$\text{Total chocolates} = 240 + 300 = \mathbf{540}.$$

SECTION D

Detailed step-wise solutions

32. Height of the cylinder = $12 - 2 - 2 = 8$ cm; radius $r = \frac{3}{2} = 1.5$ cm; height of each cone = 2 cm.

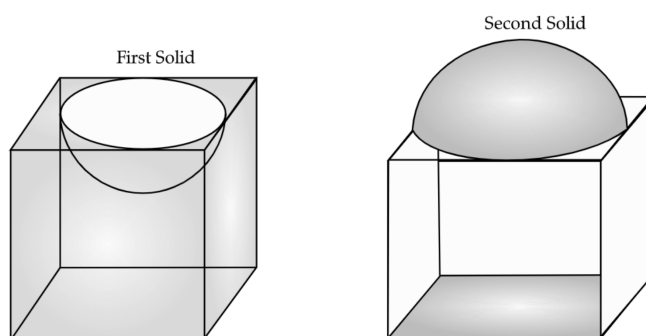


$$\text{Volume of cylinder} = \pi r^2 h = \pi (1.5)^2 \times 8 = 18\pi \text{ cm}^3.$$

$$\text{Volume of one cone} = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (1.5)^2 \times 2 = 1.5\pi \text{ cm}^3.$$

$$\text{Total volume} = 18\pi + 2(1.5\pi) = 21\pi = 21 \times \frac{22}{7} = \mathbf{66 \text{ cm}^3}.$$

OR Side $a = 14$ cm and radius of the hemisphere $r = 7$ cm.



$$(i) S_1 = 6a^2 - \pi r^2 + 2\pi r^2 = 6a^2 + \pi r^2 = 6(14)^2 + \frac{22}{7}(7)^2 = 1176 + 154 = 1330 \text{ cm}^2.$$

$$S_2 = 6a^2 - \pi r^2 + 2\pi r^2 = 1330 \text{ cm}^2. \text{ So } S_1 : S_2 = \mathbf{1:1}.$$

$$(ii) V_1 = a^3 - \frac{2}{3} \pi r^3 = 2744 - \frac{2}{3} \cdot \frac{22}{7} \cdot 343 = 2744 - \frac{2156}{3} = \frac{6076}{3} \text{ cm}^3.$$

$$V_2 = a^3 + \frac{2}{3} \pi r^3 = 2744 + \frac{2156}{3} = \frac{10388}{3} \text{ cm}^3.$$

33. Let the larger pipe alone take x hours; the smaller pipe takes $(x + 20)$ hours.

Water filled in 4 h by the larger pipe = $\frac{4}{x}$; in 9 h by the smaller pipe = $\frac{9}{x + 20}$.

$$\frac{4}{x} + \frac{9}{x + 20} = \frac{1}{2} \Rightarrow 8(x + 20) + 18x = x(x + 20).$$

$$26x + 160 = x^2 + 20x \Rightarrow x^2 - 6x - 160 = 0.$$

$$(x - 16)(x + 10) = 0 \Rightarrow x = 16 \text{ (time cannot be negative).}$$

The larger pipe alone takes **16 hours** and the smaller pipe alone takes **36 hours**.

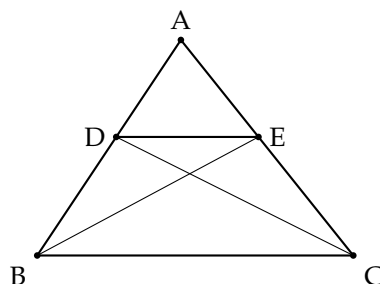
OR Let the usual speed be x km/h; the reduced speed is $(x - 150)$ km/h.

$$\frac{900}{x - 150} - \frac{900}{x} = \frac{1}{2} \Rightarrow 900 \times 150 \times 2 = x(x - 150).$$

$$x^2 - 150x - 270000 = 0 \Rightarrow (x - 600)(x + 450) = 0 \Rightarrow x = 600 \text{ (speed cannot be negative).}$$

$$\text{Scheduled duration} = \frac{900}{600} = \mathbf{1.5 \text{ hours}} \text{ (1 hour 30 minutes).}$$

34. Statement: If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, it divides the other two sides in the same ratio.



Given: $\triangle ABC$ with $DE \parallel BC$. To prove: $\frac{AD}{DB} = \frac{AE}{EC}$.

Construction: Join BE and CD ; draw $EM \perp AB$ and $DN \perp AC$.

$$\text{Proof: } \frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle BDE)} = \frac{\frac{1}{2} \times AD \times EM}{\frac{1}{2} \times DB \times EM} = \frac{AD}{DB} \dots \text{(i)}$$

$$\frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle CDE)} = \frac{\frac{1}{2} \times AE \times DN}{\frac{1}{2} \times EC \times DN} = \frac{AE}{EC} \dots \text{(ii)}$$

$\triangle BDE$ and $\triangle CDE$ are on the same base DE and between the same parallels DE and BC , so $\text{ar}(\triangle BDE) = \text{ar}(\triangle CDE) \dots \text{(iii)}$

From (i), (ii) and (iii): $\frac{AD}{DB} = \frac{AE}{EC}$. Proved.

35. Cumulative frequency table:

Class	Frequency	c.f.
0–100	2	2
100–200	5	7
200–300	x	$7 + x$
300–400	12	$19 + x$
400–500	17	$36 + x$
500–600	20	$56 + x$
600–700	y	$56 + x + y$
700–800	9	$65 + x + y$
800–900	7	$72 + x + y$
900–1000	4	$76 + x + y$

$$76 + x + y = 100 \Rightarrow x + y = 24 \dots(1)$$

Median = 550 lies in the class 500–600, so $l = 500$, $\frac{N}{2} = 50$, $cf = 36 + x$, $f = 20$, $h = 100$.

$$550 = 500 + \frac{50 - (36 + x)}{20} \times 100 \Rightarrow 50 = (14 - x) \times 5.$$

$$14 - x = 10 \Rightarrow x = 4. \text{ From (1): } y = 24 - 4 = 20.$$

SECTION E

Case-study solutions

36. (i) $\sin 30^\circ = \frac{60}{L} \Rightarrow \frac{1}{2} = \frac{60}{L} \Rightarrow L = 120 \text{ m}.$

(ii) Ravi's kite is $60 - 10 = 50 \text{ m}$ above his rooftop and the string is 120 m: $\sin \theta = \frac{50}{120} = \frac{5}{12}.$

(iii) (a) Height above the rooftop = $120 \sin 60^\circ = 60\sqrt{3} = 103.8 \text{ m}$. Height above the ground = $10 + 103.8 = 113.8 \text{ m}.$

OR (b) Height above the rooftop = $120 \sin 30^\circ = 60 \text{ m}$, so the height above the ground = $10 + 60 = 70 \text{ m}.$

37. (i) The number of books in each stack must divide 96, 240 and 336, and the number of stacks must be minimum, so it is the HCF.

$$96 = 2^5 \times 3, 240 = 2^4 \times 3 \times 5, 336 = 2^4 \times 3 \times 7 \Rightarrow \text{HCF} = 2^4 \times 3 = 48 \text{ books}.$$

(ii) Mathematics stacks = $\frac{336}{48} = 7.$

(iii) (a) Total stacks = $\frac{96}{48} + \frac{240}{48} + \frac{336}{48} = 2 + 5 + 7 = 14.$

OR (b) History stack = $48 \times 1.8 = 86.4 \text{ cm}$; Science stack = $48 \times 2.2 = 105.6 \text{ cm}$; Mathematics stack = $48 \times 2.5 = 120 \text{ cm}.$

38. (i) Centroid = $\left(\frac{-3+3-2}{3}, \frac{4+4-1}{3}\right) = \left(-\frac{2}{3}, \frac{7}{3}\right)$.

(ii) $T = \left(\frac{-2+3}{2}, \frac{-1+4}{2}\right) = \left(\frac{1}{2}, \frac{3}{2}\right)$.

(iii) (a) $U = \left(\frac{-2-3}{2}, \frac{-1+4}{2}\right) = \left(-\frac{5}{2}, \frac{3}{2}\right)$.

OR (b) $S = \left(\frac{-3+3}{2}, \frac{4+4}{2}\right) = (0, 4)$. Centroid of $\triangle STU = \left(\frac{0+\frac{1}{2}-\frac{5}{2}}{3}, \frac{4+\frac{3}{2}+\frac{3}{2}}{3}\right) = \left(-\frac{2}{3}, \frac{7}{3}\right)$.

– End of Sample Paper 01 –

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SAMPLE PAPER 02 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	–	–	–	–	4	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	1	–	3	–	–	4
Triangles	2	2	–	5	–	9
Coordinate Geometry	2	–	–	–	4	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	1	–	–	–	4	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 02**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub–parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub–part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. A 1.2 m tall girl stands at a distance of 4.8 m from a lamp post and casts a shadow of 2.4 m on the ground. Then the height of the lamp post is

(a) 3.6 m (b) 2.4 m

(c) 4.8 m (d) 7.2 m

2. If $\operatorname{cosec} A = \frac{5}{4}$, then the value of $\frac{3 \sin A + 2 \cos A}{3 \sin A - 2 \cos A}$ is

(a) 2 (b) 3

(c) 4 (d) 5

3. When 3180 is expressed as the product of its prime factors, we get

- (a) $2 \times 3^2 \times 5 \times 53$ (b) $2^2 \times 3^2 \times 5 \times 53$
(c) $2 \times 3 \times 5^2 \times 53$ (d) $2^2 \times 3 \times 5 \times 53$

4. If $\sin 2A = \frac{\sqrt{3}}{2} \tan^2 45^\circ$, where A is an acute angle, then the value of A is

- (a) 60° (b) 45°
(c) 15° (d) 30°

5. The ratio in which the y -axis divides the join of $(-4, 3)$ and $(6, 7)$ is:

- (a) $2 : 3$ (b) $3 : 2$
(c) $1 : 2$ (d) $2 : 1$

6. The solution of the following pair of equations $2x - 3y = 1$, $4x + y = 23$ is

- (a) $x = 3, y = 5$ (b) $x = 6, y = 1$
(c) $x = 5, y = 3$ (d) $x = 4, y = 2$

7. The runs scored by a batsman in 40 different matches are given below:

Runs Scored	0–20	20–40	40–60	60–80	80–100	100–120
Frequency	6	8	10	9	5	2

The lower limit of the median class is

- (a) 20 (b) 40
(c) 60 (d) 80

8. The shadow of a vertical pole 6 m high is $6\sqrt{3}$ m long. The angle of elevation of the sun is

- (a) 60° (b) 45°
(c) 30° (d) 90°

9. The ratio of the outer and inner circumferences of a circular path is $11 : 10$. If the path is 3.5 m wide, the diameter of the inner circle is

- (a) 35 m (b) 70 m
(c) 77 m (d) 140 m

10. If the quadratic equation $x^2 + 6x + k = 0$ has real and equal roots, then

(a) $k < 9$ (b) $k > 9$

(c) $k \geq 9$ (d) $k = 9$

11. A card is drawn at random from a well-shuffled deck of 52 cards. The probability that it is a king is

(a) $\frac{1}{52}$ (b) $\frac{1}{13}$

(c) $\frac{1}{4}$ (d) $\frac{4}{13}$

12. $ABCD$ is a trapezium with $AD \parallel BC$ and $AD = 5$ cm. If the diagonals AC and BD intersect each other at O such that $\frac{AO}{OC} = \frac{DO}{OB} = \frac{1}{3}$, then $BC =$

(a) 10 cm (b) 20 cm

(c) 12 cm (d) 15 cm

13. The volumes of two spheres are in the ratio 125 : 64. The ratio of their surface areas is

(a) 5 : 4 (b) 4 : 5

(c) 25 : 16 (d) 16 : 25

14. The probability of getting a bad egg in a lot of 500 eggs is 0.026. The number of bad eggs in the lot is

(a) 13 (b) 26

(c) 39 (d) 52

15. If two tangents inclined at an angle of 120° are drawn to a circle of radius 6 cm, then the length of each tangent is equal to

(a) $2\sqrt{3}$ cm (b) $3\sqrt{3}$ cm

(c) 6 cm (d) $6\sqrt{3}$ cm

16. The common difference of the A.P. whose n th term is $a_n = 3n + 7$ is

(a) 7 (b) 10

(c) 3 (d) -3

17. The area of a quadrant of a circle whose circumference is 44 cm is

- (a) $\frac{77}{8} \text{ cm}^2$ (b) $\frac{77}{4} \text{ cm}^2$
(c) $\frac{77}{2} \text{ cm}^2$ (d) 154 cm^2

18. The LCM of the smallest two-digit prime number and the smallest composite number is

- (a) 12 (b) 4
(c) 20 (d) 44

19. **Assertion (A):** If $\text{HCF}(60, 84) = 12$, then $\text{LCM}(60, 84) = 420$.

Reason (R): $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. **Assertion (A):** The point $(5, 0)$ lies on the x -axis.

Reason (R): The x -coordinate of every point on the y -axis is zero.

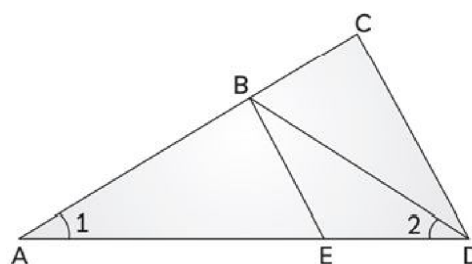
- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. In the given figure, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$.
Show that $\triangle BAE \sim \triangle CAD$. [2]



22. Two concentric circles are of radii 10 cm and 6 cm. Find the length of the chord of the larger circle which touches the smaller circle. [2]

23. For what value of k will the following system of linear equations have no solution?
 $2x + 3y = 5$; $(k + 1)x + (2k - 1)y = 4k - 1$ [2]

24. If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, where $0^\circ < A + B \leq 90^\circ$ and $A > B$, find A and B . [2]

OR

If $5 \sin^2 A + 3 \cos^2 A = 4$ and A is an acute angle, then find $\tan A$.

25. Find the area of the sector of a circle with radius 6 cm and of angle 60° . Also find the area of the corresponding major sector. (Use $\pi = 3.14$) [2]

OR

A horse is tied to a peg at one corner of a square-shaped grass field of side 25 m by means of a 10 m long rope. Find the area of that part of the field in which the horse can graze. (Use $\pi = 3.14$)

SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA-II) questions of 3 marks each.

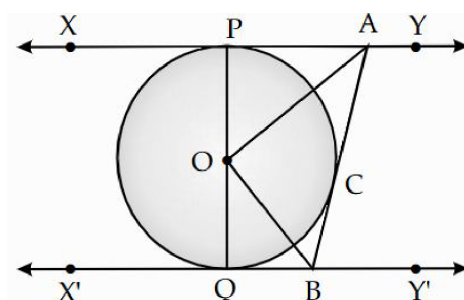
26. Prove that $\sqrt{3}$ is an irrational number. [3]

27. Prove that: $\frac{\cos^2 \theta}{1 - \tan \theta} + \frac{\sin^2 \theta}{1 - \cot \theta} = 1 + \sin \theta \cos \theta$. [3]

28. If PQ is a tangent drawn from an external point P to a circle with centre O and QOR is a diameter of length 10 cm such that $\angle POR = 120^\circ$, then find OP and PQ . [3]

OR

In the figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects XY at A and $X'Y'$ at B . What is the measure of $\angle AOB$?



29. Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 6? (ii) 13? (iii) 11? [3]

30. Solve the following linear equations: $99x + 101y = 499$ and $101x + 99y = 501$. [3]

OR

Yash scored 35 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 40 marks. How many questions were there in the test?

31. The sum of the 4th and the 8th terms of an A.P. is 24 and the sum of the 6th and the 10th terms is 44. Find the first three terms of the A.P. [3]

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. A life insurance agent found the following data for the distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 years. [5]

Age (in years)	Number of policy holders
Below 20	3
20–25	5
25–30	15
30–35	20
35–40	30
40–45	12
45–50	8
50–55	5
55–60	2

33. A motor boat whose speed is 18 km/h in still water goes 24 km downstream and comes back in 3 hours. Find the speed of the stream. [5]

OR

Rs. 7200 were divided equally among a certain number of persons. Had there been 10 more persons, each would have got Rs. 36 less. Find the original number of persons.

34. State and prove the Basic Proportionality Theorem (Thales' Theorem). [5]

35. From a solid cylinder whose height is 12 cm and diameter 7 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. (Take $\pi = \frac{22}{7}$) [5]

OR

Rasheed got a playing top (lattu) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 4.9 cm in height and the diameter of the top is 4.2 cm. Find the area he has to colour. (Take $\pi = \frac{22}{7}$)

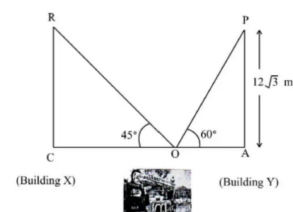
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (Fire Engine Ladder):

Due to a short circuit, a fire has broken out in New Home Complex. Two buildings, X and Y, have mainly been affected. The fire engine has arrived and it has been stationed at a point O in between the two buildings. A ladder at O is fixed in front of the fire engine. The ladder, inclined at 60° to the horizontal, is leaning against the terrace (top) of the building Y, which is $12\sqrt{3}$ m high. The foot of the ladder is kept fixed and after some time it is made to lean against the terrace of the opposite building X at an angle of 45° with the ground. Both the buildings along with the foot of the ladder O are in a straight line. (Take $\sqrt{2} = 1.41$)



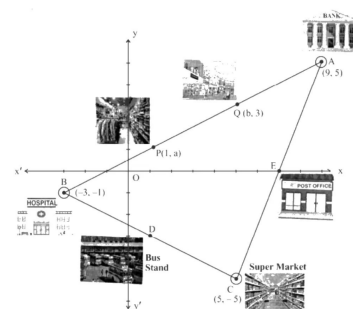
- (i) Find the length of the ladder. [1]
- (ii) Find the distance of the building Y from the point O, i.e. OA. [1]
- (iii) (a) Find the horizontal distance between the two buildings. [2]

OR

- (iii) (b) Find the height of the building X.

37. Case Study – 2 (Partha in Jerusalem):

Partha, a software engineer, lives in Jerusalem for his work. He lives in the most convenient area of the city from where the bank, hospital, post office and supermarket can be easily accessed. In the graph, the bank is plotted as $A(9, 5)$, the hospital as $B(-3, -1)$ and the supermarket as $C(5, -5)$ such that A, B, C form a triangle.



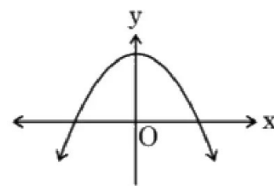
- (i) Find the distance between the bank and the hospital. [1]
- (ii) Between the bank and the supermarket there is a post office plotted at E, which is their mid-point. Find the coordinates of E. [1]
- (iii) (a) Between the hospital and the supermarket there is a bus stop plotted at D, which is their mid-point. If Partha wants to reach the bus stop from the bank, how much distance does he need to cover? [2]

OR

- (iii) (b) P and Q are two garment shops lying between the bank and the hospital such that $BP = PQ = QA$. If the coordinates of P and Q are $(1, a)$ and $(b, 3)$ respectively, find the values of a and b.

38. Case Study – 3 (The Rainbow):

A rainbow is an arch of colours that is visible in the sky after rain or when water droplets are present in the atmosphere. The colours of the rainbow are generally red, orange, yellow, green, blue, indigo and violet. Each colour of the rainbow makes a parabola. We know that any quadratic polynomial $p(x) = ax^2 + bx + c$ ($a \neq 0$) represents a parabola on the graph paper.



- (i) The graph of a rainbow $y = f(x)$ is shown in the figure. Write the number of zeroes of the curve. [1]
- (ii) If the graph of a rainbow does not intersect the x -axis but intersects the y -axis at one point, how many zeroes will it have? [1]
- (iii) (a) If a rainbow is represented by the quadratic polynomial $p(x) = x^2 + (a + 1)x + b$ whose zeroes are 2 and -3 , find the values of a and b . [2]

OR

- (iii) (b) The polynomial $x^2 - 2x - (7p + 3)$ represents a rainbow. If -4 is a zero of it, find the value of p .

———— All the Best ————

CHAPTER-WISE QUESTION INDEX

Find out which question numbers belong to which chapter

How to use this page

1. Solve the paper and check your answers with the solutions.
2. Pick a chapter from the table below and add up the marks you got in *only* the questions listed for that chapter.
3. Write that total in the Performance Tracker (next page). The chapters where you score low are the ones to revise first.

Question numbers of each chapter (Section-wise)

Chapter	A 1 mark each	B 2 marks	C 3 marks	D 5 marks	E 4 marks	Total marks
Real Numbers	3, 18, 19	–	26	–	–	6
Polynomials	–	–	–	–	38	4
Pair of Linear Equations	6	23	30	–	–	6
Quadratic Equations	10	–	–	33	–	6
Arithmetic Progressions	16	–	31	–	–	4
Triangles	1, 12	21	–	34	–	9
Coordinate Geometry	5, 20	–	–	–	37	6
Circles	15	22	28	–	–	6
Introduction to Trigonometry	2, 4	24	27	–	–	7
Some Applications of Trigonometry	8	–	–	–	36	5
Areas Related to Circles	9, 17	25	–	–	–	4
Surface Areas and Volumes	13	–	–	35	–	6
Statistics	7	–	–	32	–	6
Probability	11, 14	–	29	–	–	5
All questions	1–20	21–25	26–31	32–35	36–38	80

Example – Triangles: the questions are Q.1, Q.12 (1 mark each), Q.21 (2 marks) and Q.34 (5 marks), i.e. 9 marks in all. Add the marks you got in these four questions and write the total against *Triangles* in the tracker.

Tip: a chapter in which you get less than about 60% of its marks should be revised before the next paper.

MY PERFORMANCE TRACKER

Fill this after checking your answers with the solutions

A. Section-wise Score

Section	Type of Questions	Maximum Marks	Marks Obtained
A	MCQ & Assertion-Reason	20	
B	Very Short Answer (SA-I)	10	
C	Short Answer (SA-II)	18	
D	Long Answer (LA)	20	
E	Case Study Based	12	
Total		80	

B. Chapter-wise Performance (track where you need revision)

Chapter	Marks in Paper	Marks Obtained	Revise? (✓/×)
Real Numbers	6		
Polynomials	4		
Pair of Linear Equations	6		
Quadratic Equations	6		
Arithmetic Progressions	4		
Triangles	9		
Coordinate Geometry	6		
Circles	6		
Introduction to Trigonometry	7		
Some Applications of Trigonometry	5		
Areas Related to Circles	4		
Surface Areas and Volumes	6		
Statistics	6		
Probability	5		
TOTAL	80		

My target for the next paper: / 80

Weakest chapter to revise:

SOLUTIONS – SAMPLE PAPER 02

Class X • Mathematics (Standard) • Session 2026–27 • with step marks

Section A – Answer Key (MCQ & Assertion–Reason)

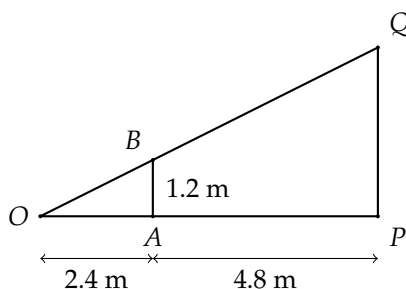
Q	1	2	3	4	5	6	7	8	9	10
Ans	(a)	(b)	(d)	(d)	(a)	(c)	(b)	(c)	(b)	(d)

Q	11	12	13	14	15	16	17	18	19	20
Ans	(b)	(d)	(c)	(a)	(a)	(c)	(c)	(d)	(a)	(b)

SECTION A

Detailed answers with reasons

1. (a) 3.6 m. Let AB be the girl and PQ the lamp post.



$$\triangle OAB \sim \triangle OPQ \text{ (AA)} \Rightarrow \frac{OA}{OP} = \frac{AB}{PQ}.$$

$$\frac{2.4}{2.4 + 4.8} = \frac{1.2}{PQ} \Rightarrow PQ = \frac{1.2 \times 7.2}{2.4} = 3.6 \text{ m.}$$

$$2. \text{ (b) } 3. \quad \operatorname{cosec} A = \frac{5}{4} \Rightarrow \sin A = \frac{4}{5} \text{ and } \cos A = \sqrt{1 - \frac{16}{25}} = \frac{3}{5}.$$

$$\frac{3 \sin A + 2 \cos A}{3 \sin A - 2 \cos A} = \frac{\frac{12}{5} + \frac{6}{5}}{\frac{12}{5} - \frac{6}{5}} = \frac{18}{6} = 3.$$

$$3. \text{ (d) } 2^2 \times 3 \times 5 \times 53. \quad 3180 \div 2 = 1590, 1590 \div 2 = 795, 795 \div 3 = 265, 265 \div 5 = 53 \text{ (prime).}$$

$$3180 = 2^2 \times 3 \times 5 \times 53.$$

$$4. \text{ (d) } 30^\circ. \quad \tan 45^\circ = 1, \text{ so } \sin 2A = \frac{\sqrt{3}}{2} = \sin 60^\circ.$$

$$2A = 60^\circ \Rightarrow A = 30^\circ.$$

5. (a) 2 : 3. Let the y -axis divide the join in the ratio $k : 1$ at the point $(0, y)$.

$$x = \frac{6k + (-4)(1)}{k + 1} = \frac{6k - 4}{k + 1} = 0 \Rightarrow k = \frac{2}{3}, \text{ so the ratio is } 2 : 3.$$

6. (c) $x = 5, y = 3$. From $4x + y = 23$: $y = 23 - 4x$.

Put in $2x - 3y = 1$: $2x - 69 + 12x = 1 \Rightarrow 14x = 70 \Rightarrow x = 5$, so $y = 3$.

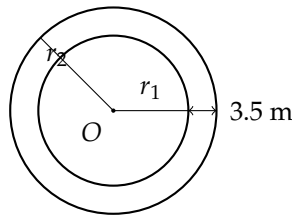
7. (b) 40. $n = 40 \Rightarrow \frac{n}{2} = 20$.

Cumulative frequencies: 6, 14, 24, 33, 38, 40; the first one ≥ 20 is 24.

Median class = 40–60, so its lower limit is 40.

8. (c) 30° . $\tan \theta = \frac{6}{6\sqrt{3}} = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30^\circ$.

9. (b) 70 m. Let the inner and outer radii be r_1 and r_2 .



$$\frac{2\pi r_2}{2\pi r_1} = \frac{11}{10} \Rightarrow r_2 = \frac{11}{10}r_1 \text{ and } r_2 - r_1 = 3.5.$$

$$\frac{r_1}{10} = 3.5 \Rightarrow r_1 = 35 \text{ m, so the diameter of the inner circle} = 70 \text{ m.}$$

10. (d) $k = 9$. Equal roots $\Rightarrow D = 0$: $6^2 - 4(1)(k) = 0 \Rightarrow 36 = 4k \Rightarrow k = 9$.

11. (b) $\frac{1}{13}$. There are 4 kings in a deck of 52 cards.

$$P = \frac{4}{52} = \frac{1}{13}.$$

12. (d) 15 cm. $AD \parallel BC \Rightarrow \triangle AOD \sim \triangle COB$.

$$\frac{AD}{BC} = \frac{AO}{OC} = \frac{1}{3} \Rightarrow \frac{5}{BC} = \frac{1}{3} \Rightarrow BC = 15 \text{ cm.}$$

$$13. (c) 25 : 16. \frac{V_1}{V_2} = \left(\frac{r_1}{r_2}\right)^3 = \frac{125}{64} \Rightarrow \frac{r_1}{r_2} = \frac{5}{4}.$$

$$\text{Ratio of surface areas} = \left(\frac{r_1}{r_2}\right)^2 = \frac{25}{16}.$$

14. (a) 13. Number of bad eggs = $0.026 \times 500 = 13$.

15. (a) $2\sqrt{3}$ cm. Let the tangents be PA and PB with $\angle APB = 120^\circ$. OP bisects it, so $\angle OPA = 60^\circ$ and $OA \perp AP$.

$$\tan 60^\circ = \frac{OA}{AP} \Rightarrow \sqrt{3} = \frac{6}{AP} \Rightarrow AP = \frac{6}{\sqrt{3}} = 2\sqrt{3} \text{ cm.}$$

16. (c) 3. $d = a_{n+1} - a_n = 3(n+1) + 7 - (3n+7) = 3$.

17. (c) $\frac{77}{2}$ cm². $2\pi r = 44 \Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7$ cm.

$$\text{Area of quadrant} = \frac{1}{4}\pi r^2 = \frac{1}{4} \times \frac{22}{7} \times 49 = \frac{77}{2} \text{ cm}^2.$$

18. (d) 44. Smallest two-digit prime number = 11; smallest composite number = 4.

$$\text{LCM}(11, 4) = 44.$$

19. (a). $\text{HCF} \times \text{LCM} = \text{product} \Rightarrow \text{LCM} = \frac{60 \times 84}{12} = 420$, so A is true.

R is true and it is the reason for A.

20. (b). The point $(5, 0)$ has y -coordinate 0, so it lies on the x -axis: A is true.

R is also true, but it does not explain A (A is about a point on the x -axis, R is about the y -axis).

SECTION B

Detailed step-wise solutions

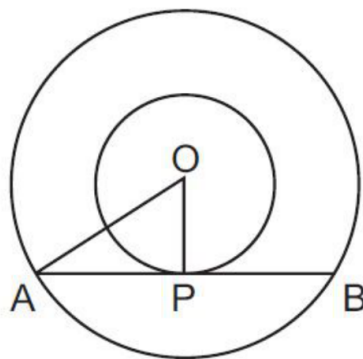
21. In $\triangle ABD$, $\angle 1 = \angle 2 \Rightarrow AB = BD$ (sides opposite equal angles) ...(i)

Given $\frac{AD}{AE} = \frac{AC}{BD}$. Using (i): $\frac{AD}{AE} = \frac{AC}{AB}$...(ii)

In $\triangle BAE$ and $\triangle CAD$: $\angle BAE = \angle CAD$ (common $\angle A$) and, by (ii), $\frac{AB}{AC} = \frac{AE}{AD}$.

$\therefore \triangle BAE \sim \triangle CAD$ (SAS similarity). Proved.

22. Let AB be the chord of the larger circle touching the smaller circle at P .



$OP \perp AB$, $OA = 10$ cm, $OP = 6$ cm, and $AP = PB$.

$$AP^2 = OA^2 - OP^2 = 100 - 36 = 64 \Rightarrow AP = 8 \text{ cm.}$$

$$AB = 2AP = \mathbf{16 \text{ cm.}}$$

23. $2x + 3y - 5 = 0$ and $(k + 1)x + (2k - 1)y - (4k - 1) = 0$.

For no solution: $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$.

$$\frac{2}{k+1} = \frac{3}{2k-1} \Rightarrow 4k - 2 = 3k + 3 \Rightarrow k = 5.$$

$$\text{Check: } \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{1}{3} \text{ but } \frac{c_1}{c_2} = \frac{5}{19} \neq \frac{1}{3} \checkmark$$

24. $\sin(A + B) = 1 = \sin 90^\circ \Rightarrow A + B = 90^\circ \dots(i)$

$$\cos(A - B) = \frac{\sqrt{3}}{2} = \cos 30^\circ \Rightarrow A - B = 30^\circ \dots(ii)$$

Adding (i) and (ii): $2A = 120^\circ \Rightarrow A = 60^\circ$; then $B = 90^\circ - 60^\circ = 30^\circ$.

OR Divide $5 \sin^2 A + 3 \cos^2 A = 4$ by $\cos^2 A$: $5 \tan^2 A + 3 = 4 \sec^2 A$.

$$5 \tan^2 A + 3 = 4(1 + \tan^2 A) \Rightarrow \tan^2 A = 1.$$

A is acute, so $\tan A = 1$.

$$25. \text{ Area of sector} = \frac{60}{360} \times 3.14 \times 6^2 = \frac{1}{6} \times 113.04 = \mathbf{18.84 \text{ cm}^2}.$$

$$\text{Area of circle} = 3.14 \times 36 = 113.04 \text{ cm}^2.$$

$$\text{Area of major sector} = 113.04 - 18.84 = \mathbf{94.2 \text{ cm}^2}.$$

OR The horse can graze a quarter circle ($\theta = 90^\circ$) of radius 10 m.

$$\text{Area} = \frac{90}{360} \times 3.14 \times 10^2 = \frac{1}{4} \times 314 = \mathbf{78.5 \text{ m}^2}.$$

SECTION C

Detailed step-wise solutions

26. Let $\sqrt{3}$ be rational, so $\sqrt{3} = \frac{p}{q}$ where p, q are co-prime and $q \neq 0$.

$p = \sqrt{3}q \Rightarrow p^2 = 3q^2$, so 3 divides p^2 , hence 3 divides p .

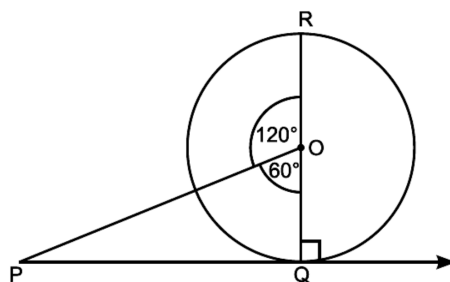
Let $p = 3m$. Then $9m^2 = 3q^2 \Rightarrow q^2 = 3m^2$, so 3 divides q .

Thus 3 is a common factor of p and q , contradicting that they are co-prime.

Hence $\sqrt{3}$ is an **irrational** number.

$$\begin{aligned} 27. \text{ LHS} &= \frac{\cos^2 \theta}{1 - \frac{\sin \theta}{\cos \theta}} + \frac{\sin^2 \theta}{1 - \frac{\cos \theta}{\sin \theta}} = \frac{\cos^3 \theta}{\cos \theta - \sin \theta} + \frac{\sin^3 \theta}{\sin \theta - \cos \theta} \\ &= \frac{\cos^3 \theta - \sin^3 \theta}{\cos \theta - \sin \theta} = \frac{(\cos \theta - \sin \theta)(\cos^2 \theta + \sin^2 \theta + \sin \theta \cos \theta)}{\cos \theta - \sin \theta} \\ &= 1 + \sin \theta \cos \theta = \text{RHS. Proved.} \end{aligned}$$

$$28. OQ = OR = \frac{10}{2} = 5 \text{ cm.}$$

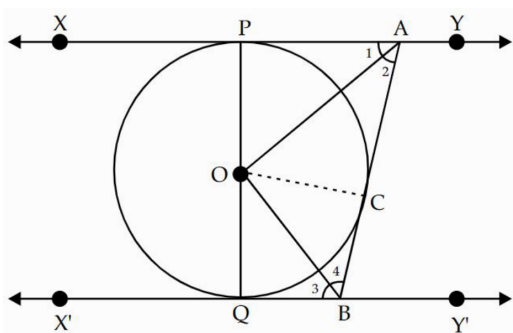


$\angle POQ = 180^\circ - 120^\circ = 60^\circ$ (linear pair) and $OQ \perp PQ$.

In right $\triangle POQ$: $\cos 60^\circ = \frac{OQ}{OP} \Rightarrow \frac{1}{2} = \frac{5}{OP} \Rightarrow OP = 10 \text{ cm.}$

$\tan 60^\circ = \frac{PQ}{OQ} \Rightarrow \sqrt{3} = \frac{PQ}{5} \Rightarrow PQ = 5\sqrt{3} \text{ cm.}$

OR Join OC.



$AP = AC$ (tangents from A), $OP = OC$ (radii), AO common $\Rightarrow \triangle PAO \cong \triangle CAO$ (SSS).

$\angle PAO = \angle CAO = \angle 1 \Rightarrow \angle PAC = 2\angle 1$. Similarly $\angle CBQ = 2\angle 2$.

$XY \parallel X'Y'$: $\angle PAC + \angle CBQ = 180^\circ \Rightarrow 2\angle 1 + 2\angle 2 = 180^\circ \Rightarrow \angle 1 + \angle 2 = 90^\circ$.

In $\triangle AOB$: $\angle AOB = 180^\circ - (\angle 1 + \angle 2) = 90^\circ$.

29. Total outcomes = 36.

(i) Sum 6: $(1, 5), (2, 4), (3, 3), (4, 2), (5, 1) = 5$ outcomes, so $P = \frac{5}{36}$.

(ii) Sum 13 is not possible, so $P = \frac{0}{36} = 0$.

(iii) Sum 11: $(5, 6), (6, 5) = 2$ outcomes, so $P = \frac{2}{36} = \frac{1}{18}$.

30. $99x + 101y = 499$...(i) and $101x + 99y = 501$...(ii)

Adding: $200x + 200y = 1000 \Rightarrow x + y = 5$...(iii)

Subtracting (i) from (ii): $2x - 2y = 2 \Rightarrow x - y = 1$...(iv)

Adding (iii) and (iv): $2x = 6 \Rightarrow x = 3$; then $y = 5 - 3 = 2$.

OR Let the number of right answers be x and wrong answers be y .

$3x - y = 35$...(i) and $4x - 2y = 40 \Rightarrow 2x - y = 20$...(ii)

Subtracting (ii) from (i): $x = 15$; then $y = 3(15) - 35 = 10$.

Total number of questions = $15 + 10 = 25$.

31. $a_4 + a_8 = 2a + 10d = 24 \Rightarrow a + 5d = 12$...(i)

$a_6 + a_{10} = 2a + 14d = 44 \Rightarrow a + 7d = 22$...(ii)

(ii) - (i): $2d = 10 \Rightarrow d = 5$; then $a = 12 - 25 = -13$.

The first three terms are **-13, -8, -3**.

SECTION D

Detailed step-wise solutions

32. Cumulative frequency table:

Age (in years)	Policy holders (f)	c.f.
Below 20	3	3
20–25	5	8
25–30	15	23
30–35	20	43
35–40	30	73
40–45	12	85
45–50	8	93
50–55	5	98
55–60	2	100

$n = 100 \Rightarrow \frac{n}{2} = 50$, so the median class is 35–40 (c.f. $73 \geq 50$).

$l = 35$, $cf = 43$, $f = 30$, $h = 5$.

Median = $l + \frac{\frac{n}{2} - cf}{f} \times h = 35 + \frac{50 - 43}{30} \times 5 = 35 + \frac{7}{6} = 36.17$ years (approx.).

33. Let the speed of the stream be x km/h.

Downstream speed = $(18 + x)$ km/h and upstream speed = $(18 - x)$ km/h.

$$\frac{24}{18 + x} + \frac{24}{18 - x} = 3 \Rightarrow \frac{24(18 - x) + 24(18 + x)}{(18 + x)(18 - x)} = 3.$$

$$\frac{864}{324 - x^2} = 3 \Rightarrow 324 - x^2 = 288 \Rightarrow x^2 = 36.$$

$x = 6$ (speed cannot be negative). Speed of the stream = **6 km/h**.

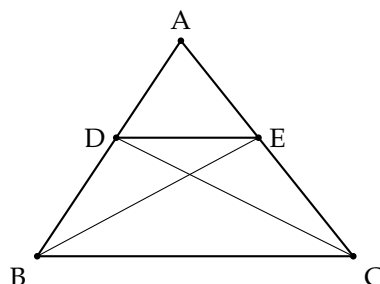
OR Let the original number of persons be x .

$$\frac{7200}{x} - \frac{7200}{x + 10} = 36 \Rightarrow \frac{7200 \times 10}{x(x + 10)} = 36.$$

$$x(x + 10) = 2000 \Rightarrow x^2 + 10x - 2000 = 0 \Rightarrow (x + 50)(x - 40) = 0.$$

$x = 40$ (cannot be negative). Original number of persons = **40**.

34. Statement: If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, it divides the other two sides in the same ratio.



Given: $\triangle ABC$ with $DE \parallel BC$. To prove: $\frac{AD}{DB} = \frac{AE}{EC}$.

Construction: Join BE and CD ; draw $EM \perp AB$ and $DN \perp AC$.

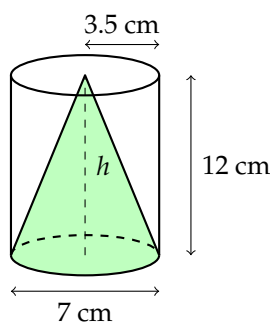
$$\text{Proof: } \frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle BDE)} = \frac{\frac{1}{2} \times AD \times EM}{\frac{1}{2} \times DB \times EM} = \frac{AD}{DB} \dots (i)$$

$$\frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle CDE)} = \frac{\frac{1}{2} \times AE \times DN}{\frac{1}{2} \times EC \times DN} = \frac{AE}{EC} \dots (ii)$$

$\triangle BDE$ and $\triangle CDE$ are on the same base DE and between the same parallels DE and BC , so $\text{ar}(\triangle BDE) = \text{ar}(\triangle CDE) \dots (iii)$

From (i), (ii) and (iii): $\frac{AD}{DB} = \frac{AE}{EC}$. Proved.

35. Radius $r = \frac{7}{2} = 3.5$ cm and height $h = 12$ cm (for both cylinder and cone).



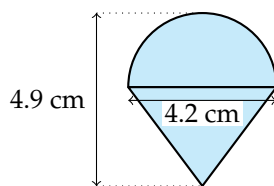
$$\text{Slant height } l = \sqrt{r^2 + h^2} = \sqrt{12.25 + 144} = \sqrt{156.25} = 12.5 \text{ cm.}$$

TSA = CSA of cylinder + CSA of cone + one base of cylinder.

$$= 2\pi rh + \pi rl + \pi r^2 = \pi r(2h + l + r).$$

$$= \frac{22}{7} \times 3.5 \times (24 + 12.5 + 3.5) = 11 \times 40 = 440 \text{ cm}^2.$$

OR $r = \frac{4.2}{2} = 2.1$ cm (for both cone and hemisphere).



Height of cone $h = 4.9 - 2.1 = 2.8$ cm.

$$l = \sqrt{r^2 + h^2} = \sqrt{4.41 + 7.84} = \sqrt{12.25} = 3.5 \text{ cm.}$$

$$\begin{aligned} \text{Area to colour} &= 2\pi r^2 + \pi r l = \pi r(2r + l) = \frac{22}{7} \times 2.1 \times (4.2 + 3.5). \\ &= 6.6 \times 7.7 = \mathbf{50.82 \text{ cm}^2}. \end{aligned}$$

SECTION E

Case-study solutions

36. (i) In right $\triangle OAP$: $\sin 60^\circ = \frac{12\sqrt{3}}{OP} \Rightarrow \frac{\sqrt{3}}{2} = \frac{12\sqrt{3}}{OP} \Rightarrow OP = \mathbf{24 \text{ m.}}$

(ii) $OA = OP \cos 60^\circ = 24 \times \frac{1}{2} = \mathbf{12 \text{ m.}}$

(iii) (a) The same ladder (24 m) now makes 45° : $OC = 24 \cos 45^\circ = 12\sqrt{2}$ m. Distance between the buildings $= OA + OC = 12 + 12\sqrt{2} = 12(1 + 1.41) = \mathbf{28.92 \text{ m.}}$

OR (b) Height of building $X = 24 \sin 45^\circ = 12\sqrt{2} = 12 \times 1.41 = \mathbf{16.92 \text{ m.}}$

37. (i) $AB = \sqrt{(9+3)^2 + (5+1)^2} = \sqrt{144 + 36} = \sqrt{180} = \mathbf{6\sqrt{5} \text{ units.}}$

(ii) $E = \left(\frac{9+5}{2}, \frac{5-5}{2} \right) = \mathbf{(7, 0).}$

(iii) (a) $D = \left(\frac{-3+5}{2}, \frac{-1-5}{2} \right) = (1, -3)$. $AD = \sqrt{(9-1)^2 + (5+3)^2} = \sqrt{128} = \mathbf{8\sqrt{2} \text{ units.}}$

OR (b) P divides BA in the ratio $1 : 2$: $P = \left(\frac{1(9) + 2(-3)}{3}, \frac{1(5) + 2(-1)}{3} \right) = (1, 1) \Rightarrow a = \mathbf{1.}$

Q divides BA in the ratio $2 : 1$: $Q = \left(\frac{2(9) + 1(-3)}{3}, \frac{2(5) + 1(-1)}{3} \right) = (5, 3) \Rightarrow b = \mathbf{5.}$

38. (i) The curve cuts the x -axis at two points, so it has **2 zeroes**.

(ii) The number of zeroes is the number of points where the graph meets the x -axis, so it has **no (0) zeroes**.

(iii) (a) Sum of zeroes $= 2 + (-3) = -1 = -(a + 1) \Rightarrow a = \mathbf{0}$. Product of zeroes $= 2 \times (-3) = -6 = b \Rightarrow b = \mathbf{-6.}$

OR (b) $x = -4$ is a zero: $(-4)^2 - 2(-4) - (7p + 3) = 0 \Rightarrow 16 + 8 - 7p - 3 = 0 \Rightarrow 7p = 21 \Rightarrow p = \mathbf{3.}$

– End of Sample Paper 02 –

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SAMPLE PAPER 03 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	–	3	–	–	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	–	–	–	–	4	4
Triangles	–	–	–	5	4	9
Coordinate Geometry	2	–	–	–	4	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	3	2	–	–	–	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 03

Session 2026–27

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub-parts of 1, 1 and 2 marks.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in the 2-mark sub-part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A

20 × 1 = 20 marks

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. The solution of the following pair of equations $x + 3y = 11$, $2x - y = 8$ is

- (a) $x = 2$, $y = 3$ (b) $x = 4$, $y = 3$
 (c) $x = 5$, $y = 2$ (d) $x = 3$, $y = 4$

2. In $\triangle ABC$, right angled at B, $AB = 6$ cm and $\sin C = \frac{3}{5}$. Determine the length of side AC.

- (a) 8 cm (b) 10 cm
 (c) 12 cm (d) none of these

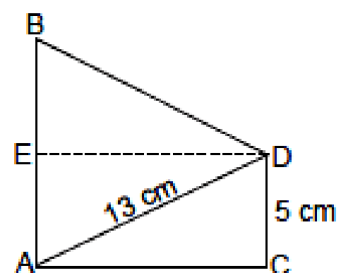
3. In the given figure, if $AB = 21$ cm, then the value of $\tan B$ is:

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

(b) $\frac{12}{5}$

(c) $\frac{5}{12}$

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



4. If the distance between the points $(6, p)$ and $(2, 0)$ is 5, then the value of p is

(a) 3 only

(b) ± 3

(c) -3 only

(d) 0

5. The angle of elevation of the sun is 60° when the shadow of a pole is $5\sqrt{3}$ m long. The height of the pole is

(a) 5 m

(b) 15 m

(c) $5\sqrt{3}$ m

(d) 10 m

6. 450 can be expressed as a product of its primes as

(a) $2 \times 3^2 \times 5^2$

(b) $2^2 \times 3 \times 5^2$

(c) $2 \times 3^3 \times 5$

(d) $2^2 \times 3^2 \times 5$

7. If one zero of the quadratic polynomial $x^2 + 5x + k$ is -2 , then the value of k is

(a) 6

(b) -6

(c) 14

(d) -14

8. A ladder 10 m long reaches a window $5\sqrt{3}$ m above the ground. The angle made by the ladder with the ground is

(a) 30°

(b) 45°

(c) 60°

(d) 90°

9. If the angle between two radii of a circle is 110° , the angle between the tangents at the ends of the radii is:

(a) 110°

(b) 90°

(c) 60°

(d) 70°

10. A bag contains 3 red and 5 blue balls. A ball is drawn at random. The probability that it is red is

- (a) $\frac{5}{8}$ (b) $\frac{3}{8}$
(c) $\frac{3}{5}$ (d) $\frac{1}{8}$

11. For the following distribution:

Class	0–5	6–11	12–17	18–23	24–29
Frequency	4	6	8	14	8

the upper limit of the median class is

- (a) 17.5 (b) 18.5
(c) 23 (d) 23.5

12. The length of the arc of a sector of angle 90° of a circle of radius 14 cm is (Use $\pi = \frac{22}{7}$)

- (a) 11 cm (b) 22 cm
(c) 44 cm (d) 88 cm

13. A cone, a hemisphere and a cylinder are of the same base and of the same height. The ratio of the volumes of the hemisphere, the cone and the cylinder is

- (a) 1 : 2 : 3 (b) 3 : 1 : 2
(c) 2 : 1 : 3 (d) 3 : 2 : 1

14. A card is selected from a deck of 52 cards. The probability of its being an ace or a king is

- (a) $\frac{3}{26}$ (b) $\frac{3}{13}$
(c) $\frac{1}{13}$ (d) $\frac{2}{13}$

15. If the radii of two circles are in the ratio of 5 : 2, then their areas are in the ratio of:

- (a) 5 : 2 (b) 10 : 3
(c) 4 : 25 (d) 25 : 4

16. A kite is flying with its string 100 m long, inclined at 30° to the ground. The height of the kite above the ground is

- (a) $50\sqrt{3}$ m (b) 100 m
(c) 50 m (d) 25 m

17. What is the positive real root of $49x^2 - 4 = 0$?

- (a) $\frac{2}{7}$ (b) $\frac{4}{7}$
(c) $\frac{7}{2}$ (d) $\frac{2}{49}$

18. If two positive integers a and b are written as $a = x^4y^2$ and $b = x^2y^3$, where x and y are prime numbers, then the HCF(a, b) is:

- (a) xy (b) x^4y^3
(c) x^2y^2 (d) x^2y^3

19. **Assertion (A):** The HCF of two numbers is 12 and their LCM is 1260. If one number is 60, then the other number is 252.

Reason (R): For two numbers a and b , $a \times b = \text{HCF}(a, b) \times \text{LCM}(a, b)$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. **Assertion (A):** The value of y can be 4, if the distance between the points $P(1, -2)$ and $Q(9, y)$ is 10.

Reason (R): The distance between two points is given by $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. For what value of k does the following pair of linear equations have infinitely many solutions: $x + 2y = 4$, $(k - 1)x + (k + 3)y = 3k + 1$? [2]

22. Simplify: $\frac{\tan^2 \theta}{1 + \tan^2 \theta} + \frac{\cot^2 \theta}{1 + \cot^2 \theta}$ [2]

OR

If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, then find $x^2 + y^2$.

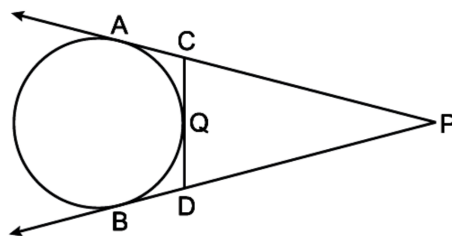
23. The angle of elevation of the top of a tower from a point on the ground, 45 m away from its foot, is 30° . Find the height of the tower. (Use $\sqrt{3} = 1.73$) [2]

24. The length of the minute hand of a clock is 35 cm. Find the area swept by the minute hand in 12 minutes. [2]

OR

In a circle of radius 14 cm, an arc subtends an angle of 90° at the centre. Find (i) the length of the arc, (ii) the area of the sector formed by the arc.

25. In the figure, PA and PB are tangents to the circle drawn from an external point P . CD is the third tangent touching the circle at Q . If $PA = 12$ cm, find the perimeter of $\triangle PCD$. [2]



SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA–II) questions of 3 marks each.

26. A part of the monthly hostel charges in a college is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days, he has to pay Rs. 1000 as hostel charges; whereas a student B , who takes food for 26 days, pays Rs. 1240 as hostel charges. Find the fixed charges and the cost of food per day. [3]

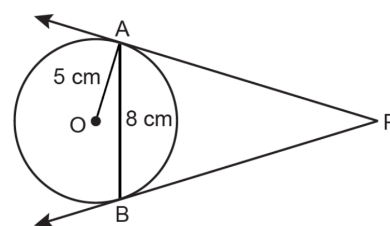
OR

Meena went to a bank to withdraw Rs. 1,600. She asked the cashier to give her Rs. 50 and Rs. 100 notes only. Meena got 22 notes in all. How many notes of Rs. 50 and Rs. 100 did she receive?

27. If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of $2x^2 - 9x + 10$, then find the values of p and q . [3]

28. Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 4? (ii) 9? (iii) less than or equal to 6? [3]

29. In the given figure, AB is a chord of length 8 cm of a circle of radius 5 cm. The tangents to the circle at A and B intersect at P . Find the length of AP . [3]



OR

Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

30. If $\operatorname{cosec} \theta + \cot \theta = p$, prove that $\cos \theta = \frac{p^2 - 1}{p^2 + 1}$. [3]

31. Prove that $\sqrt{11}$ is an irrational number. [3]

SECTION D

4 × 5 = 20 marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. Some students planned a picnic. The total budget for food was Rs. 800. But 4 students failed to attend the picnic and thus the cost of food for each member increased by Rs. 10. How many students attended the picnic and how much did each student pay for the food? [5]

OR

A cottage industry produces a certain number of toys in a day. The cost of production of each toy (in rupees) was found to be 60 minus the number of toys produced in a day. On a particular day, the total cost of production was Rs. 800. Find the number of toys produced on that day.

33. The following frequency distribution gives the monthly consumption of 68 consumers of a locality. Find the median, mean and mode of the data and compare them. [5]

Consumption (units)	65–85	85–105	105–125	125–145	145–165	165–185	185–205
Number of consumers	5	6	12	21	13	8	3

34. Two cubes each of volume 343 cm^3 are joined end to end. Find the volume and the surface area of the resulting cuboid. [5]

OR

A solid is in the shape of a cone surmounted on a hemisphere with both their diameters being equal to 14 cm and the height of the cone is equal to its radius. Find the volume of the solid. (Take $\pi = \frac{22}{7}$)

35. State and prove the Basic Proportionality Theorem. [5]

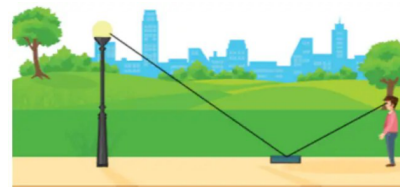
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (The Mirror and the Pole):

The law of reflection states that when a ray of light reflects off a surface, the angle of incidence is equal to the angle of reflection. Suresh places a mirror on level ground to determine the height of a pole (with a traffic light fixed on it). He stands at a certain distance so that he can see the top of the pole reflected from the mirror. Suresh's eye level is 1.5 m above the ground. The distances of Suresh and the pole from the mirror are 1.8 m and 6 m respectively.



- (i) Which criterion of similarity is applicable to the similar triangles formed? [1]
- (ii) What is the height of the pole? [1]
- (iii) (a) If the angle of incidence is i , find $\tan i$. [2]

OR

(iii) (b) Suresh now moves back so that the distance between the pole and Suresh is 13 m. He places the mirror between himself and the pole to see the reflection of the light. What is the distance between the mirror and Suresh?

37. Case Study – 2 (The Marathon):

The marathon is a long-distance foot race with a distance of 42.195 km, usually run as a road race, but the distance can also be covered on trail routes. The marathon was one of the original modern Olympic events in 1896. Neha, a student of Class X, wishes to participate in a marathon. She decided to begin her practice by gradually increasing her running distance. In the first week, she decided to run 3 km each day and increase the distance by 2 km each week, i.e. in the second week she would run 5 km each day, in the third week 7 km each day and so on.



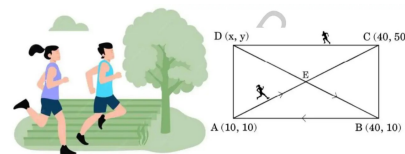
- (i) What distance will Neha cover each day of the 8th week of her practice? [1]
- (ii) In which week would she be able to run 45 km each day? [1]
- (iii) (a) What is the total distance covered by Neha after 11 weeks, if she practised for 5 days in each week? [2]

OR

(iii) (b) Had she increased the distance by 3 km each week instead of 2 km each week, in how many weeks would she have trained herself to run 42 km per day?

38. Case Study – 3 (Race on the Field):

A field is in the form of a rectangle. The coordinates of the rectangular field $ABCD$ are $A(10, 10)$, $B(40, 10)$, $C(40, 50)$ and $D(x, y)$. Anil and Anita, two friends, decided to have a race. Anita started from point A and moved to point E along the diagonal AC , where E is the point of intersection of both the diagonals of $ABCD$. From E she moved to B along the other diagonal DB and then moved back to A along BA . Anil started from C and ran to A via D along the boundary of the field.



- (i) Find the coordinates of the point E . [1]
- (ii) Find the distance between the points B and C . [1]
- (iii) (a) Find the coordinates of the point D and the distance BD . [2]

OR

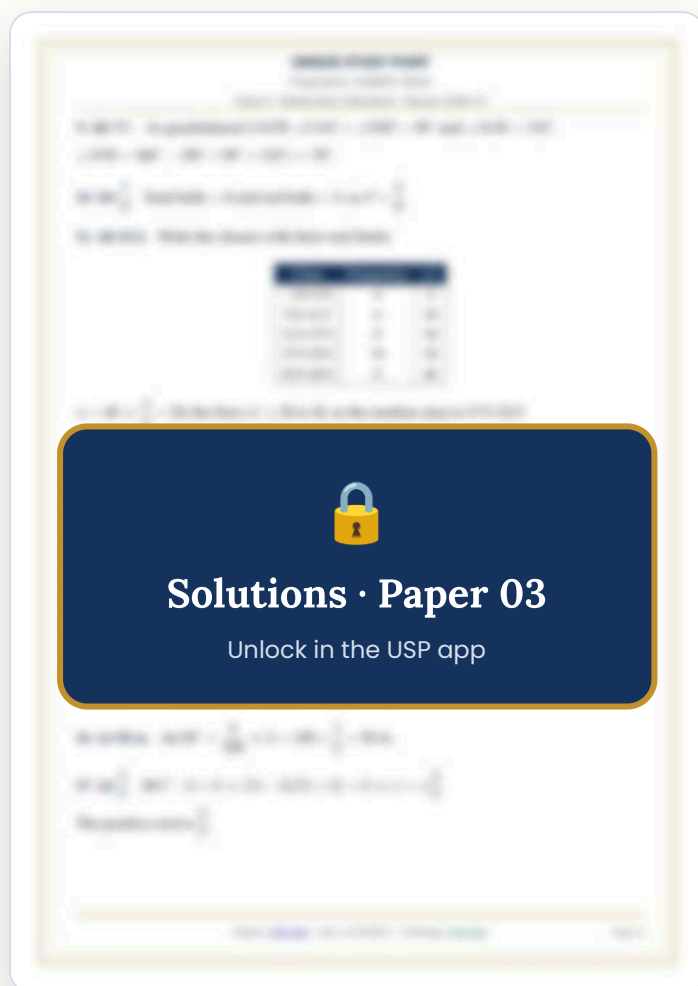
- (iii) (b) Find the total distance travelled by Anita.

———— All the Best ————

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SAMPLE PAPER 04 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	–	3	–	–	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	–	–	–	–	4	4
Triangles	2	2	–	5	–	9
Coordinate Geometry	3	–	3	–	–	6
Circles	–	2	–	–	4	6
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	1	–	–	–	4	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 04**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub–parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub–part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. The distance between the points $(-5, 2)$ and $(7, -3)$ is
 (a) 12 units (b) 5 units
 (c) 13 units (d) 17 units
2. The area of the circle that can be inscribed in a square of side 14 cm is
 (a) $196\pi \text{ cm}^2$ (b) $49\pi \text{ cm}^2$
 (c) $98\pi \text{ cm}^2$ (d) $14\pi \text{ cm}^2$

3. For the following distribution:

Class	10–20	20–30	30–40	40–50	50–60
Frequency	6	16	12	14	8

the sum of the lower limits of the median class and the modal class is

(a) 40 (b) 50

(c) 60 (d) 70

4. The ratio of the volumes of two spheres is $27 : 64$. The ratio between their surface areas is

(a) $3 : 4$ (b) $27 : 64$

(c) $16 : 9$ (d) $9 : 16$

5. If $\text{HCF}(36, 84) = 12$, then $\text{LCM}(36, 84)$ is

(a) 252 (b) 504

(c) 84 (d) 36

6. The pair of linear equations $3x - 2y = 4$ and $6x - 4y = 9$ is

(a) consistent (b) dependent consistent

(c) inconsistent (d) none of these

7. Nature of roots of the quadratic equation $4x^2 - 12x + 9 = 0$ is

(a) real and unequal (b) not real

(c) real and equal (d) none of these

8. If $\triangle ABC \sim \triangle EDF$ and $\triangle ABC$ is not similar to $\triangle DEF$, then which of the following is not true?

(a) $BC \cdot EF = AC \cdot FD$ (b) $AB \cdot EF = AC \cdot DE$

(c) $BC \cdot DE = AB \cdot FD$ (d) $BC \cdot DE = AB \cdot EF$

9. $\triangle ABC \sim \triangle PQR$. If AM and PN are altitudes of $\triangle ABC$ and $\triangle PQR$ respectively and $AB^2 : PQ^2 = 25 : 49$, then $AM : PN =$

(a) $25 : 49$ (b) $5 : 7$

(c) $7 : 5$ (d) $49 : 25$

10. If the angle of elevation of the sun is 45° , then the length of the shadow of a tower 25 m high is

- (a) 25 m (b) $25\sqrt{2}$ m
(c) 50 m (d) 12.5 m

11. Two coins are tossed simultaneously. The probability of getting exactly one head is

- (a) $\frac{1}{4}$ (b) $\frac{3}{4}$
(c) $\frac{1}{2}$ (d) 1

12. If two positive integers p and q can be expressed as $p = a^2b^3$ and $q = a^4b$, a, b being prime numbers, then $\text{HCF}(p, q)$ is

- (a) ab (b) a^4b^3
(c) a^2b^3 (d) a^2b

13. The perimeter of a triangle with vertices $(0, 6)$, $(0, 0)$ and $(8, 0)$ is

- (a) 24 units (b) 14 units
(c) 18 units (d) 48 units

14. A card is selected at random from a well shuffled deck of 52 cards. The probability of its being a red king is

- (a) $\frac{1}{13}$ (b) $\frac{1}{52}$
(c) $\frac{2}{13}$ (d) $\frac{1}{26}$

15. In $\triangle ABC$ right angled at B , $\sin A = \frac{8}{17}$, then the value of $\cos C$ is

- (a) $\frac{15}{17}$ (b) $\frac{8}{17}$
(c) $\frac{8}{15}$ (d) $\frac{15}{8}$

16. If $4 \tan \theta = 3$, then the value of $\frac{4 \sin \theta - \cos \theta}{4 \sin \theta + \cos \theta}$ is

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$
(c) $\frac{2}{3}$ (d) $\frac{1}{4}$

17. The area of a quadrant of a circle whose circumference is 88 cm is

- (a) 77 cm^2 (b) 308 cm^2
(c) 154 cm^2 (d) 616 cm^2

18. The zeroes of the polynomial $x^2 - 5x - m(m + 5)$ are

- (a) $-m, m + 5$ (b) $m, m + 5$
(c) $m, -(m + 5)$ (d) $-m, -(m + 5)$

19. **Assertion (A):** The value of x is 3, if the distance between the points $P(x, 2)$ and $Q(9, 8)$ is 10.

Reason (R): The distance between two points is given by $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. **Assertion (A):** The HCF of two numbers is 6 and their LCM is 1260. If one number is 84, then the other number is 90.

Reason (R): For two numbers a and b , $a \times b = \text{HCF}(a, b) \times \text{LCM}(a, b)$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

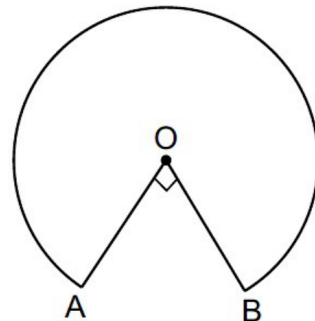
21. If $\tan(A + B) = \sqrt{3}$ and $\sin(A - B) = \frac{1}{2}$, where $0^\circ < A + B \leq 90^\circ$ and $A > B$, then find the measures of angles A and B . [2]

OR
Find an acute angle θ when $\frac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta} = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}$.

22. The length of the minute hand of a clock is 7 cm. Find the area swept by it when it moves from 3:10 pm to 3:55 pm. [2]

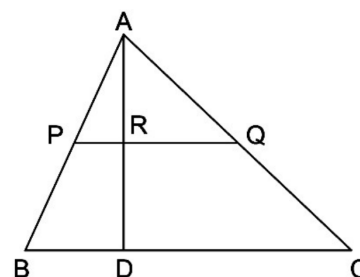
OR

In the given figure, the top of a table is the part of a circle with centre O that remains after the sector AOB with $\angle AOB = 90^\circ$ is removed. If $AO = OB = 28$ cm, then find the perimeter of the top of the table. [Take $\pi = \frac{22}{7}$]



23. For what value of k will the following pair of linear equations have infinitely many solutions? $kx + 4y - (k - 4) = 0$ and $16x + ky - k = 0$ [2]

24. In the given figure, $AP = 4$ cm, $AR = 5.6$ cm, $AQ = 8$ cm, $AB = 6$ cm and $AC = 12$ cm. Find the length of AD . [2]



25. Two concentric circles are of radii 13 cm and 12 cm. Find the length of the chord of the larger circle which touches the smaller circle. [2]

SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA-II) questions of 3 marks each.

26. A train covered a certain distance at a uniform speed. If the train would have been 10 km/h faster, it would have taken 3 hours less than the scheduled time. And, if the train were slower by 10 km/h, it would have taken 5 hours more than the scheduled time. Find the length of the journey. [3]

27. Prove that: $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \sec \theta + \tan \theta$. [3]

28. Three coins are tossed simultaneously. What is the probability of getting (i) exactly two heads? (ii) at least one head? (iii) at most one tail? [3]

29. Find the ratio in which the point $P(2, y)$ divides the line segment joining $A(-4, 3)$ and $B(6, 8)$. Also find the value of y . [3]

30. Given that $\sqrt{3}$ is irrational, prove that $5 - 2\sqrt{3}$ is irrational. [3]

31. Find the zeroes of the quadratic polynomial $6x^2 - 2 - x$ and verify the relationship between the zeroes and the coefficients of the polynomial. [3]

OR

Find the quadratic polynomial, the sum and product of whose zeroes are 1 and -12 respectively. Also find the zeroes of the polynomial so obtained.

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. The median of the following data is 865. Find the values of x and y , if the total frequency is 100. [5]

Class	800–820	820–840	840–860	860–880	880–900	900–920	920–940
Frequency	6	12	x	24	y	9	4

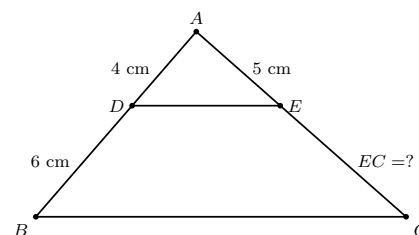
33. A motor boat whose speed is 15 km/h in still water takes 1 hour more to go 20 km upstream than to return downstream to the same spot. Find the speed of the stream. [5]

OR

An express train takes 1 hour less than a passenger train to travel 180 km between two stations (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 15 km/h more than that of the passenger train, find the average speed of the two trains.

34. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio. [5]

In the figure, find EC if $\frac{AD}{DB} = \frac{AE}{EC}$, using the above theorem.



35. A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of the base of the cone is 10.5 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. (Take $\pi = \frac{22}{7}$) [5]

OR

A vessel full of water is in the form of an inverted cone of height 12 cm and the radius of its top, which is open, is 4 cm. 12 spherical lead balls of equal size are dropped into the vessel. One fourth of the water flows out of the vessel. Find the radius of a spherical ball.

SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (The Eight-Lane Track):

In order to organise the Annual Sports Day, a school prepared an eight-lane running track with an integrated football field inside the track area. The length of the innermost lane of the track is 400 m and each subsequent lane is 7.6 m longer than the preceding lane. Based on the given information, answer the following questions using the concept of Arithmetic Progression.

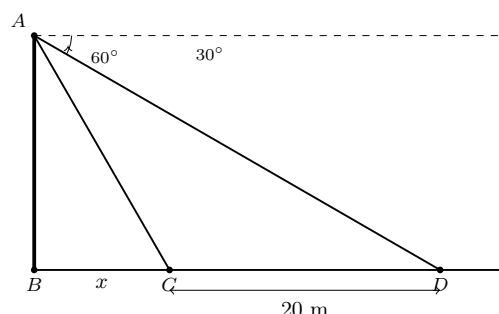
- (i) What is the length of the 6th lane? [1]
- (ii) How much longer is the 8th lane than the 4th lane? [1]
- (iii) (a) While practising for a race, a student took one round each in the first six lanes. Find the total distance covered by the student. [2]

OR

- (iii) (b) A student took one round each in lane 4 to lane 8. Find the total distance covered by the student.

37. Case Study – 2 (Vijay and the Car):

Vijay lives in a flat in a multi-storey building. Initially, his driving was rough, so his father keeps an eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of the car from the building was 60° . After accelerating 20 m from point C, Vijay stops at point D to buy ice cream and the angle of depression changed to 30° . (Take $\sqrt{3} = 1.73$)



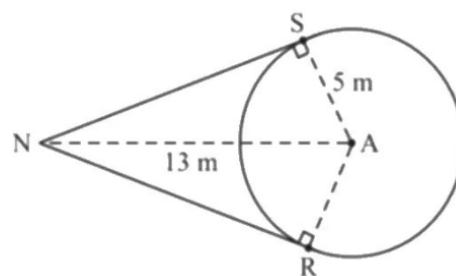
- (i) Find the value of x . [1]
- (ii) Find the height of the building AB. [1]
- (iii) (a) Find the distance between the top of the building and the car at position D. [2]

OR

- (iii) (b) Find the distance between the top of the building and the car at position C.

38. Case Study – 3 (The Throwball Practice):

In an international school in Hyderabad, an Interschool Throwball Tournament for girls was organised just after the pre-board exam. The team captain Anju directed the team to assemble in the ground for practice. Only three girls, Aarushi, Sarika and Avni, showed up. Anju drew a circle of radius 5 m on the ground. The centre A was the position of Aarushi. Anju marked a point N , 13 m away from the centre A , as her own position. From the point N she drew two tangential lines NS and NR and gave the positions S and R to Sarika and Avni.



- (i) Find the measure of $\angle NSA$. [1]
- (ii) Find the distance between Sarika and Anju. [1]
- (iii) (a) If $\angle SNR$ is equal to θ , find $\angle NAS$. [2]

OR

- (iii) (b) Find $\angle SNR + \angle SAR$.

———— All the Best ————

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SAMPLE PAPER 05 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	–	3	–	–	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	–	–	–	–	4	4
Triangles	2	2	–	5	–	9
Coordinate Geometry	2	–	–	–	4	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	1	2	–	–	4	7
Some Applications of Trigonometry	2	–	3	–	–	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 05

Session 2026–27

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub-parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub-part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A

20 × 1 = 20 marks

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. The ratio in which the x -axis divides the join of $(3, -6)$ and $(7, 4)$ is:
- (a) $2 : 3$ (b) $3 : 2$
- (c) $1 : 2$ (d) $2 : 1$
2. In $\triangle ABC$ and $\triangle DEF$, $\angle B = \angle E$, $\angle F = \angle C$ and $AB = DE$. Then, the two triangles are
- (a) congruent but not similar (b) similar but not congruent
- (c) neither congruent nor similar (d) congruent as well as similar

3. The roots of the quadratic equation $x^2 - 7x + 12 = 0$ are

- (a) $-3, -4$ (b) $3, 4$
(c) $3, -4$ (d) $-3, 4$

4. Two circles touch each other externally at C and AB is a common tangent of the circles. Then $\angle ACB$ is

- (a) 70° (b) 60°
(c) 100° (d) 90°

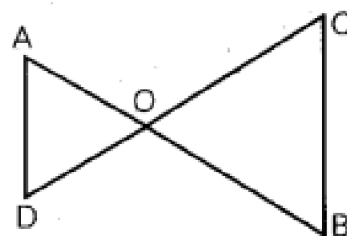
5. The sum of the lower limit of the median class and the upper limit of the modal class of the following data is:

Marks	0–10	10–20	20–30	30–40	40–50	50–60
No. of students	6	14	20	28	16	8

- (a) 60 (b) 70
(c) 80 (d) 90

6. In the figure, if $\frac{OA}{OD} = \frac{OC}{OB}$, then which pair of angles are equal?

- (a) $\angle A = \angle C, \angle B = \angle D$ (b) $\angle A = \angle B, \angle C = \angle D$
(c) $\angle C = \angle B, \angle A = \angle D$ (d) None of these



7. A ladder 8 m long makes an angle of 60° with the ground. The distance of the foot of the ladder from the wall is

- (a) $4\sqrt{3}$ m (b) 8 m
(c) 4 m (d) 2 m

8. The radius of the largest right circular cone that can be cut out from a cube of edge 7 cm is

- (a) 3.5 cm (b) 7 cm
(c) 14 cm (d) 1.75 cm

9. If the perimeter of a circle is equal to that of a square, then the ratio of the area of the circle to the area of the square is

- (a) 14 : 11 (b) 12 : 13
(c) 11 : 14 (d) 13 : 12

10. The value of a , if $\text{HCF}(a, 18) = 3$ and $\text{LCM}(a, 18) = 90$, is:

- (a) 5 (b) 10
(c) 15 (d) 30

11. The probability of getting a number greater than 4 on throwing a die is

- (a) $\frac{1}{6}$ (b) $\frac{1}{3}$
(c) $\frac{1}{2}$ (d) $\frac{2}{3}$

12. From a point 20 m away from the foot of a tower, the angle of elevation of its top is 45° . The height of the tower is

- (a) 10 m (b) $20\sqrt{2}$ m
(c) 20 m (d) 40 m

13. Given that $\sin \alpha = \frac{1}{\sqrt{2}}$ and $\cos \beta = \frac{\sqrt{3}}{2}$, then the value of $(\alpha + \beta)$ is

- (a) 60° (b) 90°
(c) 45° (d) 75°

14. The HCF of the smallest two-digit composite number and the smallest composite number is:

- (a) 2 (b) 1
(c) 4 (d) 10

15. The solution of the following pair of equations $x + 2y = 8$, $3x - y = 3$ is:

- (a) $x = 3, y = 2$ (b) $x = 4, y = 2$
(c) $x = 2, y = 3$ (d) $x = 1, y = 4$

16. Write a quadratic polynomial whose sum of zeroes is $\frac{1}{2}$ and product of zeroes is $-\frac{3}{2}$.

(a) $2x^2 + x - 3$

(b) $x^2 - 2x - 3$

(c) $x^2 + 2x - 3$

(d) $2x^2 - x - 3$

17. A horse is tied to a pole with a 14 m long rope. The perimeter of the field where the horse can graze is (Take $\pi = \frac{22}{7}$)

(a) 44 m

(b) 88 m

(c) 154 m

(d) 616 m

18. Two different dice are thrown together. The probability of getting the sum of the two numbers greater than 9 is:

(a) $\frac{1}{12}$

(b) $\frac{5}{36}$

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

(d) $\frac{1}{9}$

19. **Assertion (A):** The number 8^n , n being a natural number, ends with the digit 5.

Reason (R): The number 15^n cannot end with the digit 0 for any natural number n .

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

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

(c) A is true but R is false

(d) A is false but R is true

20. **Assertion (A):** The values of x are 7 and -1 , if the distance between the points $P(3,4)$ and $Q(x,7)$ is 5.

Reason (R): The distance between two points is given by $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

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

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

(c) A is true but R is false

(d) A is false but R is true

SECTION B

5 × 2 = 10 marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. For what value of k does the following pair of linear equations have infinitely many solutions: $2x + 3y = 7$, $(k - 2)x + (k + 1)y = 3k - 3$ [2]

22. The length of the minute hand of a clock is 21 cm. Find the area swept by the minute hand in 20 minutes. [2]

OR

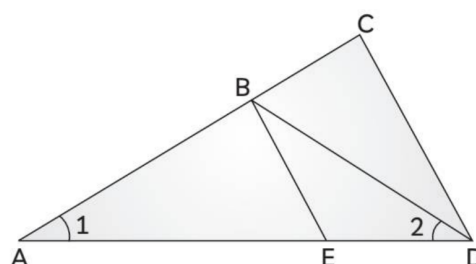
A horse is tied to a peg at one corner of a square-shaped grass field of side 21 m by means of a 7 m long rope. Find the area of that part of the field in which the horse can graze. (Use $\pi = \frac{22}{7}$)

23. Evaluate: $2 \cos^2 60^\circ + 3 \sin^2 45^\circ - \tan^2 60^\circ$. [2]

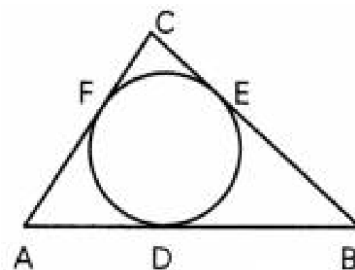
OR

If $\tan \theta = \frac{5}{12}$, evaluate $\frac{(1 - \sin \theta)(1 + \sin \theta)}{(1 - \cos \theta)(1 + \cos \theta)}$.

24. In the given figure, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$.
Show that $\triangle BAE \sim \triangle CAD$. [2]



25. A circle is inscribed in a $\triangle ABC$ having $AB = 9$ cm, $BC = 13$ cm and $CA = 8$ cm and touching these sides at D, E, F respectively. Find the lengths of AD, BE and CF . [2]



SECTION C

6 × 3 = 18 marks

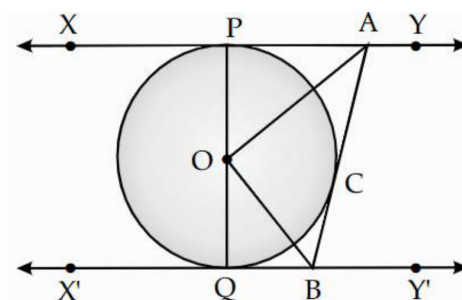
This section has 6 Short Answer (SA–II) questions of 3 marks each.

26. Prove that $\sqrt{13}$ is an irrational number. [3]
27. All the red face cards are removed from a pack of 52 playing cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting (i) a face card (ii) a black card (iii) a red card. [3]

28. Prove that a parallelogram circumscribing a circle is a rhombus. [3]

OR

In the figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects XY at A and $X'Y'$ at B . What is the measure of $\angle AOB$?



29. The area of a rectangle gets reduced by 16 square units, if its length is reduced by 4 units and its breadth is increased by 2 units. If we increase the length by 2 units and the breadth by 3 units, the area increases by 90 square units. Find the dimensions of the rectangle. [3]

OR

Meena went to a bank to withdraw Rs. 2,400. She asked the cashier to give her Rs. 50 and Rs. 100 notes only. Meena got 30 notes in all. How many notes of Rs. 50 and Rs. 100 did she receive?

30. The angle of elevation of the top of a tower from a point on the ground is 30° . On walking 60 m towards the tower, the angle of elevation becomes 60° . Find the height of the tower. [3]

31. Find the zeroes of the polynomial $x^2 + 2x - 15$, and verify the relation between the coefficients and the zeroes of the polynomial. [3]

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. If the median of the following distribution is 60 and the sum of all the frequencies is 140, what are the values of x and y ? [5]

Class	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95
Frequency	8	10	x	25	40	y	15	7

33. Some students planned a picnic. The total budget for food was Rs. 3,000. But 5 students failed to attend the picnic and thus the cost of food for each member increased by Rs. 20. How many students attended the picnic and how much did each student pay for the food? [5]

OR

If Zeba was younger by 4 years than what she really is, then the square of her age (in years) would have been 48 more than six times her actual age. What is her age now?

34. A cubical block of side 14 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per 100 sq. cm. (Use $\pi = \frac{22}{7}$) [5]

OR

Due to heavy floods in a state, thousands were rendered homeless. 40 schools collectively decided to provide place and the canvas for 800 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.1 m and height 4 m and the upper part is conical with the same base radius, but of height 2.8 m. If the canvas used to make the tents costs Rs. 150 per m^2 , find the amount shared by each school to set up the tents.

35. State and prove the Basic Proportionality Theorem. [5]

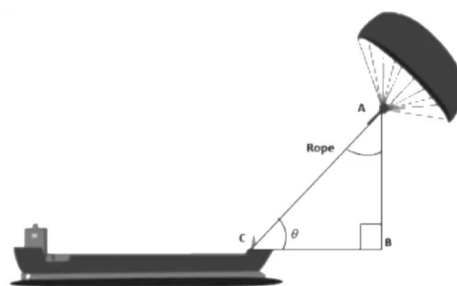
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (Skysails):

Skysails is the genre of engineering science that uses extensive utilisation of wind energy to move a vessel in the sea water. The 'Skysails' technology allows the towing kite to gain a height of anything between 100 m and 300 m. The sailing kite is made in such a way that it can be raised to its proper elevation and then brought back with the help of a 'telescopic mast' that enables the kite to be raised properly and effectively.



- (i) In the given figure, if $\sin \theta = \cos(\theta - 30^\circ)$, where θ and $\theta - 30^\circ$ are acute angles, find the value of θ . [1]
- (ii) What should be the length of the rope of the kite sail in order to pull the ship at the angle θ (calculated above) and be at a vertical height of 200 m? [1]
- (iii) (a) In the given figure, if $\sin \theta = \cos(3\theta - 30^\circ)$, where θ and $3\theta - 30^\circ$ are acute angles, find the value of θ . [2]

OR

- (iii) (b) What should be the length of the rope of the kite sail in order to pull the ship at the angle θ (calculated in (iii)(a)) and be at a vertical height of 150 m?

37. Case Study – 2 (The Examination Hall):

In an examination hall, students are seated at a distance of 2 m from each other to maintain social distance due to the corona virus pandemic. Let three students sit at points A , B and C whose coordinates are $(4, -3)$, $(7, 3)$ and $(8, 5)$ respectively.



- (i) What is the distance between A and C ? [1]
- (ii) An invigilator at point I lies on the straight line joining B and C such that it divides the distance between them in the ratio $1 : 2$. What are the coordinates of I ? [1]
- (iii) (a) What is the mid-point of the line segment joining A and C ? [2]

OR

- (iii) (b) What is the ratio in which B divides the line segment joining A and C ?

38. Case Study – 3 (The Charity Run):

A school is organising a charity run to raise funds for a local hospital. The run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organisers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10.



- (i) Write the fourth, fifth and sixth terms of the Arithmetic Progression so formed. [1]
- (ii) Determine the distance of the 8th round. [1]
- (iii) (a) Find the total distance run after completing all 10 rounds. [2]

OR

- (iii) (b) If a runner completes only the first 6 rounds, what is the total distance run by the runner?

———— All the Best ————

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SAMPLE PAPER 06 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	–	3	–	–	4
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	–	–	–	–	4	4
Triangles	2	2	–	5	–	9
Coordinate Geometry	2	–	–	–	4	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	1	–	–	–	4	5
Areas Related to Circles	2	2	–	–	–	4
Surface Areas and Volumes	1	–	–	5	–	6
Statistics	1	–	–	5	–	6
Probability	2	–	3	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 06

Session 2026–27

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub–parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub–part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A

20 × 1 = 20 marks

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. If $r = 3$ is a root of the quadratic equation $kr^2 - 2kr - 3 = 0$, then the value of k is:

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

2. In $\triangle ABC$, $DE \parallel BC$ and $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, then the value of x is:

- (a) 2 (b) 3
(c) 4 (d) 5

3. In $\triangle ABC$ right angled at B , if $\tan A = \sqrt{3}$, then $\cos A \cos C + \sin A \sin C =$

- (a) -1 (b) 0
(c) 1 (d) $\frac{\sqrt{3}}{2}$

4. If $\text{LCM}(x, 24) = 120$ and $\text{HCF}(x, 24) = 4$, then x is:

- (a) 20 (b) 10
(c) 5 (d) 40

5. The vertices of a parallelogram in order are $A(-1, 2)$, $B(3, y)$, $C(x, 5)$ and $D(1, 4)$. Then (x, y) is:

- (a) $(3, 5)$ (b) $(5, 3)$
(c) $(4, 3)$ (d) $(3, 4)$

6. If the circumference of a circle and the perimeter of a square are equal, then

- (a) Area of the circle = Area of the square (b) Area of the circle $>$ Area of the square
(c) Area of the circle $<$ Area of the square (d) Nothing definite can be said about the relation between the areas of the circle and the square

7. If the angle of elevation of the top of a tower from a point of observation at a distance of 40 m from its base is 60° , then the height of the tower is:

- (a) 40 m (b) 80 m
(c) $\frac{40}{\sqrt{3}}$ m (d) $40\sqrt{3}$ m

8. A letter is chosen at random from the English alphabet. The probability that it is a vowel is

- (a) $\frac{1}{26}$ (b) $\frac{5}{26}$
(c) $\frac{21}{26}$ (d) $\frac{1}{5}$

9. If the mean of the following distribution is 2.5, then the value of y is

Variable (x)	1	2	3	4	5
Frequency	4	5	y	1	1

(a) 6 (b) 12

(c) 9 (d) 18

10. Two dice are thrown at the same time. The probability that the sum of the two numbers is a prime number is

(a) $\frac{1}{3}$ (b) $\frac{7}{12}$

(c) $\frac{5}{12}$ (d) $\frac{1}{2}$

11. The radii of two cylinders are in the ratio 3 : 4 and their heights are in the ratio 2 : 5. Then the ratio of their volumes is:

(a) 9 : 40 (b) 9 : 20

(c) 3 : 10 (d) 6 : 25

12. The value of k for which the lines $2x + 5y = 7$ and $6x + 15y = k$ coincide is:

(a) 14 (b) 21

(c) 12 (d) 7

13. If the sum and the product of the zeroes of a quadratic polynomial are 5 and 6 respectively, then the polynomial is

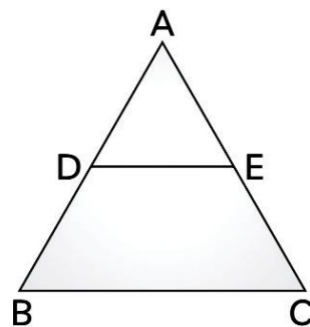
(a) $x^2 + 5x + 6$ (b) $x^2 - 6x + 5$

(c) $x^2 - 5x + 6$ (d) $x^2 + 6x - 5$

14. In the figure, if $DE \parallel BC$, $AD = 4$ cm, $BD = 5$ cm and $BC = 18$ cm, then DE equals:

(a) 6 cm (b) 10 cm

(c) 12 cm (d) 8 cm



15. The ratio of LCM and HCF of the least composite number and the least odd prime number is:

- (a) 1 : 12 (b) 12 : 1
(c) 4 : 3 (d) 3 : 4

16. If $3 \tan \theta = 4$, then the value of $\frac{3 \sin \theta - 2 \cos \theta}{3 \sin \theta + 2 \cos \theta}$ is

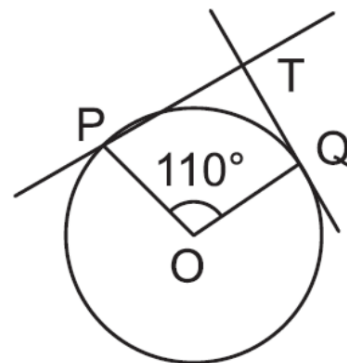
- (a) $\frac{1}{2}$ (b) $\frac{1}{5}$
(c) $\frac{2}{3}$ (d) $\frac{1}{3}$

17. If the area of a circle is numerically equal to three times its circumference, then the diameter of the circle is

- (a) 12 units (b) 6 units
(c) 8 units (d) 18 units

18. In the given figure, if TP and TQ are tangents to a circle with centre O , so that $\angle POQ = 110^\circ$, then $\angle PTQ$ is

- (a) 70° (b) 110°
(c) 90° (d) 80°



19. **Assertion (A):** 21^n never ends with the digit zero, where n is a natural number.

Reason (R): A number ends with the digit zero only if its prime factorisation contains both 2 and 5.

- (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false (d) A is false but R is true

20. Assertion (A): The point $(0, 4)$ divides the line segment joining the points $(-3, 10)$ and $(6, -8)$ in the ratio $2 : 1$ internally.

Reason (R): If three points A, B, C form an equilateral triangle, then $AB = BC = AC$.

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. If $41x + 53y = 147$ and $53x + 41y = 135$, then find the values of x and y . [2]

22. If $\cos(A + B) = 0$ and $\cos(A - B) = \frac{1}{2}$, $0^\circ \leq A + B \leq 90^\circ$ and $A > B$, then find A and B . [2]

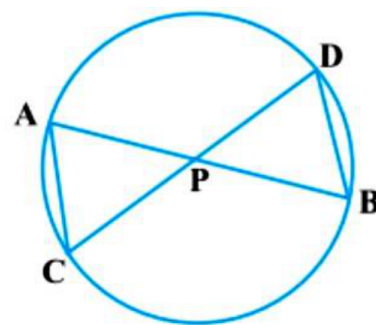
23. Two concentric circles are of radii 17 cm and 8 cm. Find the length of the chord of the larger circle which touches the smaller circle. [2]

24. Find the area of the sector of a circle with radius 9 cm and of angle 40° . Also, find the area of the corresponding major sector. (Use $\pi = 3.14$) [2]

OR

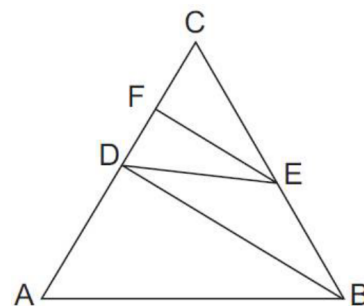
What is the angle subtended at the centre of a circle of radius 12 cm by an arc of length 4π cm?

25. In the figure, two chords AB and CD intersect each other at the point P . Prove that (i) $\triangle APC \sim \triangle DPB$ (ii) $AP \cdot PB = CP \cdot DP$. [2]



OR

In the figure, if $AB \parallel DE$ and $BD \parallel EF$, then prove that $DC^2 = CF \times AC$.



SECTION C

$6 \times 3 = 18$ marks

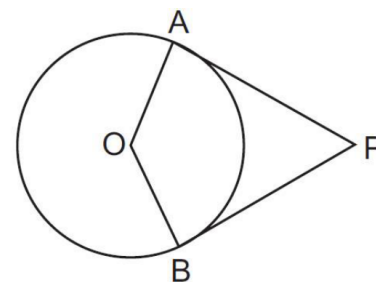
This section has 6 Short Answer (SA–II) questions of 3 marks each.

26. Prove that: $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \sec \theta + \tan \theta$. [3]

OR

If $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$, show that $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$.

27. In the given figure, OP is equal to the diameter of the circle.
Prove that $\triangle ABP$ is an equilateral triangle. [3]



28. A part of the monthly hostel charges in a college is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days, he has to pay Rs. 1150 as hostel charges; whereas a student B, who takes food for 28 days, pays Rs. 1510 as hostel charges. Find the fixed charges and the cost of food per day. [3]

OR

Anuj had some chocolates, and he divided them into two lots A and B. He sold the first lot at the rate of Rs. 2 for 3 chocolates and the second lot at the rate of Rs. 1 per chocolate, and got a total of Rs. 400. If he had sold the first lot at the rate of Rs. 1 per chocolate, and the second lot at the rate of Rs. 4 for 5 chocolates, his total collection would have been Rs. 390. Find the total number of chocolates he had.

29. Four bells toll at intervals of 12, 16, 18 and 24 seconds respectively. All the four begin to toll together. Find the number of times they toll together in one hour, excluding the one at the start. [3]

30. What number should be added to the polynomial $x^2 - 6x + 5$ so that 2 is a zero of the polynomial? [3]

31. Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8? (ii) 12? (iii) at most 4? [3]

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. Two pipes running together can fill a cistern in $3\frac{3}{4}$ hours. If one pipe takes 4 hours more than the other to fill it, find the time in which each pipe would fill the cistern. [5]

OR

In a flight of 720 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 120 km/h and the time of the flight increased by 30 min. Find the scheduled duration of the flight.

33. The distribution below gives the marks of 100 students of a class. If the median marks are 23, find the frequencies f_1 and f_2 . [5]

Marks	0–5	5–10	10–15	15–20	20–25	25–30	30–35	35–40
No. of students	4	8	12	f_1	20	f_2	16	4

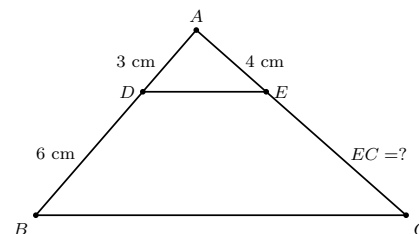
34. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 4 m and 7 m respectively, and the slant height of the top is 4.5 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs. 400 per m^2 . (Take $\pi = \frac{22}{7}$) [5]

OR

A rectangular metal block has length 21 cm, breadth 14 cm and height 7 cm. From this block, a circular hole of diameter 7 cm is drilled out through its height. Find: (i) the volume of the remaining solid (ii) the surface area of the remaining solid. (Take $\pi = \frac{22}{7}$)

35. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio." [5]

In the figure, find EC if $\frac{AD}{DB} = \frac{AE}{EC}$, using the above theorem.



SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (Yoga in the Society):

In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people attended the yoga session. On each following day, 3 more people attended than on the previous day, i.e. 8 people on day two, 11 people on day three, and so on.



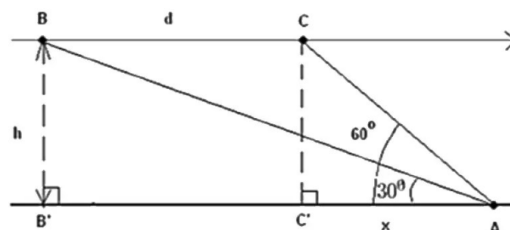
- (i) On which day did 59 people attend the yoga session? [1]
- (ii) How many people attended the yoga session on the 31st day? [1]
- (iii) (a) The yoga instructor was paid Rs. 100 for each person attending a session. On which day would he earn Rs. 5,000? [2]

OR

- (iii) (b) What was the total amount earned by the yoga instructor in 16 days?

37. Case Study – 2 (The Pilot):

Mr. Vinod is a pilot in Air India. During the Covid-19 pandemic, many Indian passengers were stuck at Dubai Airport and the Government of India sent special aircraft to bring them back. Mr. Vinod was leading this operation. He is flying from Dubai to New Delhi with these passengers. His aeroplane is approaching a point A on the ground along a straight line at a constant altitude h . At 10:00 am the angle of elevation of the aeroplane from A is 30° and at 10:01 am it is 60° .



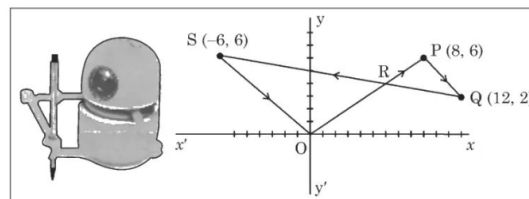
- (i) What is the distance d covered by the aeroplane from 10:00 am to 10:01 am if its speed is constant and equal to 600 miles/hour? [1]
- (ii) What is the altitude h of the aeroplane? (Round the answer to 2 decimal places; use $\sqrt{3} = 1.732$) [1]
- (iii) (a) Find the distance between the passenger at A and the aeroplane when the angle of elevation is 30° . [2]

OR

- (iii) (b) Find the distance between the passenger at A and the aeroplane when the angle of elevation is 60° .

38. Case Study – 3 (The Painting Robot):

Gurveer and Arushi built a robot that can paint a path as it moves on a graph paper. Some co-ordinates of points are marked on it. It starts from $(0,0)$, moves to the points listed in order (in straight lines) and ends at $(0,0)$. Arushi entered the points $P(8,6)$, $Q(12,2)$ and $S(-6,6)$ in order. The path drawn by the robot is shown in the figure.



- (i) Determine the distance OP . [1]
- (ii) QS is represented by the equation $2x + 9y = 42$. Find the coordinates of the point where it intersects the y -axis. [1]
- (iii) (a) Point $R(4.8, y)$ divides the line segment OP in a certain ratio. Find the ratio and hence the value of y . [2]

OR

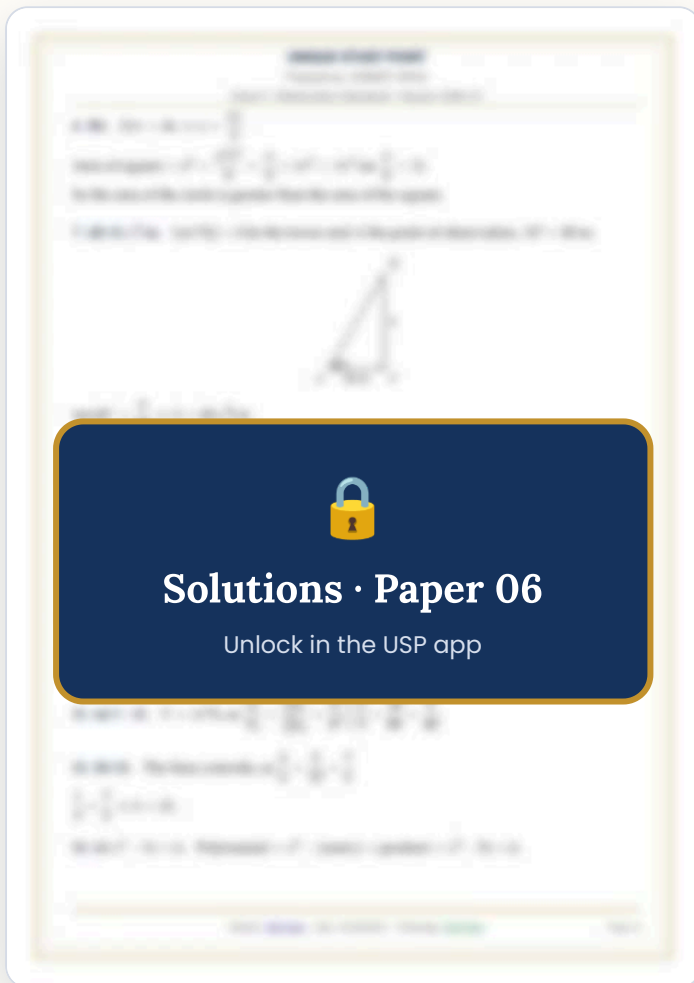
(iii) (b) Using the distance formula, show that $\frac{PQ}{OS} = \frac{2}{3}$.

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SAMPLE PAPER 07 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	2	–	–	–	3
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	1	–	–	–	4	5
Triangles	–	–	–	5	4	9
Coordinate Geometry	4	2	–	–	–	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	1	–	6	–	–	7
Some Applications of Trigonometry	2	–	3	–	–	5
Areas Related to Circles	–	–	–	5	–	5
Surface Areas and Volumes	1	–	–	–	4	5
Statistics	1	–	–	5	–	6
Probability	3	2	–	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 07**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub-parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub-part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. The pair of equations $2x - 3y + 4 = 0$ and $-4x + 6y - 8 = 0$ has

(a) a unique solution	(b) exactly two solutions
(c) infinitely many solutions	(d) no solution
2. The length of a tangent from a point A at a distance 13 cm from the centre of the circle is 12 cm. The radius of the circle is:

(a) 3 cm	(b) 5 cm
(c) 7 cm	(d) 10 cm

3. The mid-point of the line segment joining the points $A(3, -5)$ and $B(-7, 1)$ is

- (a) $(-2, 2)$ (b) $(2, -2)$
(c) $(5, -3)$ (d) $(-2, -2)$

4. If $C(2, -3)$ is the mid-point of the line segment AB joining the points $A(5, x)$ and $B(-1, 4)$, then the value of x is:

- (a) -10 (b) 10
(c) 2 (d) -2

5. Which of the following relationships is correct?

- (a) $P(E) = 1 + P(\bar{E})$ (b) $P(\bar{E}) - P(E) = 1$
(c) $P(E) + P(\bar{E}) = 1$ (d) $P(E) = 2P(\bar{E})$

6. The ratio in which the line segment joining the points $P(-4, 3)$ and $Q(5, -6)$ is divided by $O(-1, 0)$ is:

- (a) $1 : 2$ (b) $3 : 4$
(c) $2 : 7$ (d) $1 : 3$

7. The distance of the point $P(-5, 7)$ from the y -axis is

- (a) 7 (b) 5
(c) 12 (d) 2

8. The sum of the exponents of the prime factors in the prime factorisation of 360 is:

- (a) 3 (b) 4
(c) 5 (d) 6

9. The median class of the following frequency distribution is:

Class	0–10	10–20	20–30	30–40	40–50	50–60
Frequency	4	9	12	21	10	4

- (a) 10–20 (b) 20–30
(c) 30–40 (d) 40–50

10. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $c \neq 0$, are equal, then

- (a) c and b have opposite signs
(b) c and a have opposite signs
(c) c and b have the same sign
(d) c and a have the same sign

11. If one root of the equation $2x^2 - 5x + k - 3 = 0$ is the reciprocal of the other, then the value of k is:

- (a) -5
(b) 5
(c) 2
(d) -2

12. If a cylinder is covered by two hemispherical lids of equal shape, then the total curved surface area of the new object will be

- (a) $4\pi rh + 2\pi r^2$
(b) $4\pi rh - 2\pi r^2$
(c) $2\pi rh + 4\pi r^2$
(d) $2\pi rh + 2\pi r^2$

13. A circus artist is climbing a 40 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the distance of the pole from the peg in the ground, if the angle made by the rope with the ground level is 30° .

- (a) 20 m
(b) $20\sqrt{3}$ m
(c) $40\sqrt{3}$ m
(d) $10\sqrt{3}$ m

14. The 10th term of the A.P. 3, 8, 13, ... is

- (a) 43
(b) 53
(c) 38
(d) 48

15. If $P(E) = 0.38$, then what is the probability of 'not E '?

- (a) 0.62
(b) 0.72
(c) 0.38
(d) 0.52

16. If $2520 = 2^x \times 3^y \times 5 \times 7$, then $(x - y)$ is equal to:

- (a) 6
(b) -1
(c) 1
(d) 0

17. A box contains cards numbered 11 to 60. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square is:

- (a) $\frac{1}{12}$ (b) $\frac{4}{45}$
(c) $\frac{1}{10}$ (d) $\frac{2}{25}$

18. In $\triangle ABC$, right-angled at B , $AC = 17$ cm and $BC = 8$ cm. The value of $\tan C$ is:

- (a) $\frac{15}{8}$ (b) $\frac{8}{15}$
(c) $\frac{17}{8}$ (d) $\frac{8}{17}$

19. **Assertion (A):** The largest number that divides 63 and 89, leaving remainders 3 and 5 respectively, is 12.

Reason (R): $\text{HCF}(60, 84) = 12$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. The angle of depression of a boat from the top of a 30 m high lighthouse is 30° . The distance of the boat from the foot of the lighthouse is

- (a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m
(c) 30 m (d) 60 m

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. Find the points on the x -axis which are at a distance of $5\sqrt{2}$ from the point $(6, -5)$. How many such points are there? [2]

OR

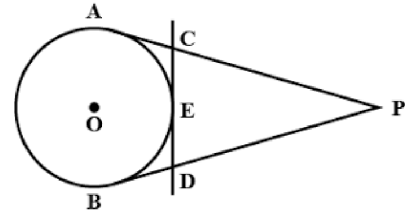
If A and B are $(-3, 5)$ and $(4, -9)$ respectively, find the coordinates of the point P such that $AP = \frac{2}{7}AB$ and P lies on the line segment AB .

22. Two dice are thrown at the same time. Find the probability of getting (i) a sum of 9 (ii) a sum less than 5. [2]

23. XY and PQ are two tangents drawn at the end points of the diameter AB of a circle. Prove that $XY \parallel PQ$. [2]

OR

From an external point P , tangents PA and PB are drawn to a circle with centre O . If CD is a tangent to the circle at a point E and $PA = 11$ cm, find the perimeter of $\triangle PCD$.



24. Solve for x and y : $47x + 29y = 170$, $29x + 47y = 134$. [2]

25. Find the value of k such that the polynomial $x^2 - (2k + 1)x + (k + 7)$ has the sum of its zeroes equal to the product of its zeroes. [2]

SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA–II) questions of 3 marks each.

26. Prove that: $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$ [3]

27. Prove that $7 + 3\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. [3]

28. A father's age is four times the sum of the ages of his two children. After 6 years his age will be twice the sum of their ages. Find the present age of the father. [3]

29. From the top of a 60 m high building, the angles of depression of the top and the bottom of a tower are 45° and 60° respectively. Find the height of the tower. (Use $\sqrt{3} = 1.73$) [3]

30. Prove that: $(\tan A + \sec A)^2 + (\tan A - \sec A)^2 = 2 \left(\frac{1 + \sin^2 A}{1 - \sin^2 A} \right)$ [3]

OR

Prove that $\frac{\cos A}{1 - \sin A} + \frac{1 - \sin A}{\cos A} = 2 \sec A$.

31. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. [3]

OR

Prove that the tangent drawn at any point of a circle is perpendicular to the radius through the point of contact.

SECTION D

4 × 5 = 20 marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. A motorboat whose speed in still water is 10 km/h goes 24 km downstream and comes back to the same spot in a total time of 5 hours. Find the speed of the stream. [5]

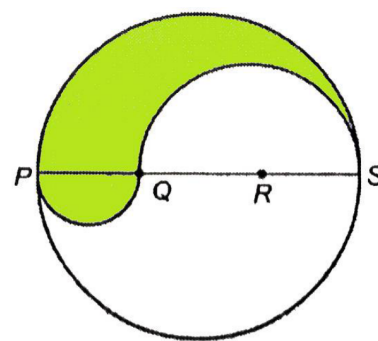
OR

A takes 5 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 6 days, find the time taken by B to finish the work.

33. A chord of a circle of radius 12 cm subtends an angle of 60° at the centre. Find the areas of the corresponding minor and major segments of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$) [5]

OR

PQRS is a diameter of a circle of radius 9 cm. The lengths PQ, QR and RS are equal. Semicircles are drawn on PQ and QS as diameters as shown in the figure. Find the perimeter and the area of the shaded region. (Use $\pi = 3.14$)



34. The median of the following data is 53. Find the values of x and y , if the total frequency is 100. [5]

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80	80–90	90–100
Frequency	3	6	x	12	16	20	y	10	6	3

35. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio. [5]

Using the above theorem, prove that a line through the point of intersection of the diagonals and parallel to the base of a trapezium divides the non-parallel sides in the same ratio.

SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (The Stupa of Sanchi):

Ashish is a Class IX student. His class teacher Mrs. Verma arranged a historical trip to the great Stupa of Sanchi. She explained that the Stupa of Sanchi is a great example of architecture in India. Its base part is cylindrical in shape. The dome of this stupa is hemispherical in shape, known as Anda. It also contains a cubical part called Harmika at the top. The path around the Anda is known as the Pradakshina Path. (Use $\pi = \frac{22}{7}$)



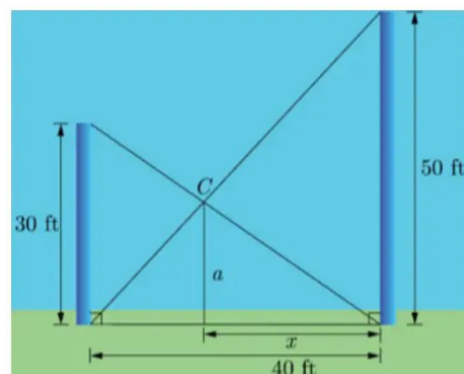
- (i) Find the volume of the Harmika, if the side of the cubical part is 10 m. [1]
- (ii) Find the volume of the cylindrical base part whose diameter and height are 48 m and 14 m. [1]
- (iii) (a) If the volume of each brick used is 0.01 m^3 , find the number of bricks used to make the cylindrical base. [2]

OR

- (iii) (b) If the diameter of the Anda is 42 m, find the volume of the Anda.

37. Case Study – 2 (The Two Poles):

Two poles, 30 feet and 50 feet tall, are 40 feet apart and perpendicular to the ground. The poles are supported by wires attached from the top of each pole to the bottom of the other, as shown in the figure. A coupling is placed at C where the two wires cross.



- (i) What is the horizontal distance from C to the taller pole? [1]
- (ii) How high above the ground is the coupling? [1]
- (iii) (a) How far down the wire from the smaller pole is the coupling? [2]

OR

- (iii) (b) Find the length of the line joining the tops of the two poles.

38. Case Study – 3 (Cable Cars):

Cable cars at hill stations are one of the major tourist attractions. On a hill station, the length of the cable car ride from the base point to the topmost point on the hill is 5000 m. Poles are installed at equal intervals on the way to provide support to the cables on which the car moves. The distance of the first pole from the base point is 200 m and the subsequent poles are installed at equal intervals of 150 m. Further, the distance of the last pole from the top is 300 m. Based on the above information, answer the following questions using Arithmetic Progression.



- (i) Find the distance of the 10th pole from the base. [1]
- (ii) Find the distance between the 15th pole and the 25th pole. [1]
- (iii) (a) Find the time taken by the cable car to reach the 15th pole from the top if it is moving at a speed of 5 m/s and coming from the top. [2]

OR

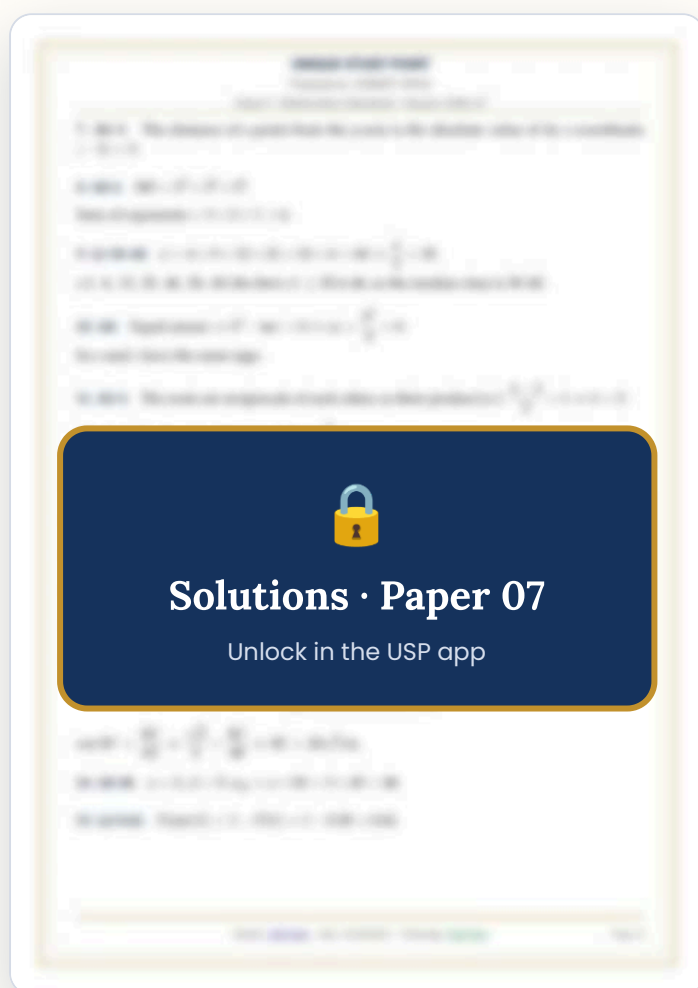
- (iii) (b) Find the total number of poles installed along the entire journey.

———— All the Best ————

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SAMPLE PAPER 08 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	3	–	3	–	–	6
Polynomials	1	2	–	–	–	3
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	5	–	6
Arithmetic Progressions	2	–	3	–	–	5
Triangles	–	–	–	5	4	9
Coordinate Geometry	4	2	–	–	–	6
Circles	1	2	3	–	–	6
Introduction to Trigonometry	1	–	6	–	–	7
Some Applications of Trigonometry	1	–	–	–	4	5
Areas Related to Circles	–	–	–	5	–	5
Surface Areas and Volumes	1	–	–	–	4	5
Statistics	1	–	–	5	–	6
Probability	3	2	–	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 08**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub-parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub-part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. HCF of $(2^4 \times 3^2 \times 5)$, $(2^3 \times 3^3 \times 5^2)$ and $(2^5 \times 3 \times 5^3 \times 7)$ is

- (a) 60 (b) 120
(c) 240 (d) 30

2. If the coordinates of one end of a diameter of a circle are $(3, -4)$ and the coordinates of its centre are $(1, 2)$, then the coordinates of the other end of the diameter are

- (a) $(2, -1)$ (b) $(5, -10)$
(c) $(-1, -8)$ (d) $(-1, 8)$

3. The least number that is divisible by all the numbers from 1 to 8 (both inclusive) is:

- (a) 840 (b) 420
(c) 1680 (d) 2520

4. A bag has 6 white marbles, 9 red marbles and 5 purple marbles. If we take a marble randomly, then what is the probability of not getting a purple marble?

- (a) 0.25 (b) 0.5
(c) 0.75 (d) 0.55

5. $\frac{1}{\sin^2 \theta} - \frac{1}{\tan^2 \theta}$ is equal to:

- (a) -1 (b) 1
(c) $\sec^2 \theta$ (d) $\sin^2 \theta$

6. If $x = 2$ is a zero of the quadratic polynomial $kx^2 + 3x - 2k$, then the value of k is:

- (a) 3 (b) 6
(c) -6 (d) -3

7. If the lines $2x + 3ky - 5 = 0$ and $4x + 9y + 1 = 0$ are parallel, then what is the value of k ?

- (a) $\frac{2}{3}$ (b) 6
(c) $\frac{3}{2}$ (d) $\frac{1}{6}$

8. A sphere of diameter 12 cm is dropped into a cylindrical vessel of diameter 24 cm, partly filled with water. If the sphere is completely submerged, then the water level rises by

- (a) 2 cm (b) 4 cm
(c) 3 cm (d) 1.5 cm

9. The length of the tangent from a point 10 cm away from the centre of a circle of radius 6 cm is

- (a) 4 cm (b) 6 cm
(c) 8 cm (d) 16 cm

10. The 12th term of the A.P. 5, 9, 13, ... is

- (a) 49 (b) 53
(c) 45 (d) 61

11. The mode and the mean of a data are 24 and 27 respectively. Then the median is:

- (a) 25 (b) 26
(c) 27 (d) 28

12. If the distance between the points $A(2, -3)$ and $B(5, x)$ is equal to 3, then the value of x is:

- (a) 3 (b) 0
(c) 6 (d) -3

13. The roots of the quadratic equation $x^2 - 9 = 0$ is/are:

- (a) 3 only (b) $-3, 3$
(c) 9 only (d) $-9, 9$

14. The angle of depression of a car, standing on the ground, from the top of a 90 m tower is 60° . The distance of the car from the base of the tower (in metres) is

- (a) $30\sqrt{3}$ (b) $90\sqrt{3}$
(c) 60 (d) $45\sqrt{3}$

15. In what ratio does the x -axis divide the join of $A(1, -3)$ and $B(5, 9)$?

- (a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 1

16. If $P(A)$ denotes the probability of an event A , then

- (a) $P(A) < 0$ (b) $P(A) > 1$
(c) $0 \leq P(A) \leq 1$ (d) $-1 \leq P(A) \leq 1$

17. A card is selected at random from a well shuffled deck of 52 playing cards. The probability of its being an ace or a face card is

- (a) $\frac{3}{13}$ (b) $\frac{4}{13}$
(c) $\frac{6}{13}$ (d) $\frac{9}{13}$

18. The distance between the points $(3, -2)$ and $(-2, 10)$ is:

- (a) 17 units (b) 169 units
(c) 5 units (d) 13 units

19. The first term of an A.P. is 8 and its 5th term is 20. Its common difference is

- (a) 3 (b) 2
(c) 4 (d) 12

20. **Assertion (A):** The HCF of two numbers is 12 and their product is 2160. Then their LCM = 150.

Reason (R): If a, b are two positive integers, then $\text{HCF} \times \text{LCM} = a \times b$.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting (i) a black face card (ii) a spade or an ace. [2]

OR

Cards marked with the numbers 2, 3, 4, ..., 51 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears (i) a perfect square number (ii) a prime number.

22. Two concentric circles are of radii 25 cm and 7 cm. Find the length of the chord of the larger circle which touches the smaller circle. [2]

23. If the point $P(k, 2)$ is equidistant from the points $A(5, 4)$ and $B(-1, 6)$, find the value of k . [2]

OR

Find the ratio in which the point $C(3, y)$ divides the line segment joining the points $A(-1, 2)$ and $B(6, 16)$. Also find y .

24. Find the zeroes of the quadratic polynomial $p(t) = 4t^2 + 12t + 5$ and verify the relationship between the zeroes and the coefficients. [2]

25. If the system of equations $2x + 3y = 7$ and $(2a - b)x + (a + b)y = 21$ has infinitely many solutions, then find a and b . [2]

SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA–II) questions of 3 marks each.

26. Find the sum of all two-digit numbers which are multiples of 7. [3]

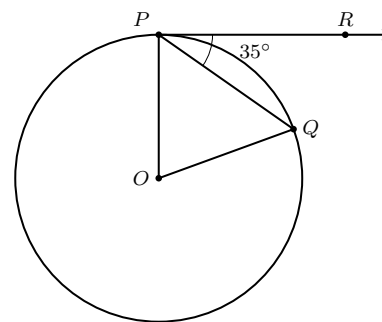
27. Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$. [3]

28. If $3x + y = 21$ and $2x - y = 4$, find the values of $3y - 2x$ and $\frac{y}{x} - 1$. [3]

29. (a) Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. [3]

OR

(b) If O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 35° with PQ , then find the measure of $\angle POQ$.



30. If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, prove that $m^2 - n^2 = 4\sqrt{mn}$. [3]

31. Given that $\sqrt{3}$ is irrational, prove that $(4 + \sqrt{3})$ is an irrational number. [3]

OR

On a morning walk, three persons step off together and their steps measure 36 cm, 40 cm and 48 cm respectively. Find the minimum distance each should walk so that each can cover the same distance in complete steps.

SECTION D

4 × 5 = 20 marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. Out of a group of swans, $\frac{9}{2}$ times the square root of the total number of swans are playing on the shore of a tank. The remaining 9 are playing, with an amorous fight, in the water. What is the total number of swans? [5]

OR

A plane left 30 minutes later than its scheduled time and, in order to reach the destination 1000 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed.

33. A horse is tied to a peg at one corner of a square-shaped grass field of side 20 m by means of a 7 m long rope. [5]

Find (i) the area of that part of the field in which the horse can graze. (ii) the increase in the grazing area if the rope were 14 m long instead of 7 m. (Use $\pi = \frac{22}{7}$)

OR

The figure depicts a racing track whose left and right ends are semicircular. The distance between the two inner parallel line segments is 42 m and they are each 90 m long. If the track is 7 m wide, find (i) the distance around the track along its inner edge (ii) the area of the track. (Use $\pi = \frac{22}{7}$)



34. A survey regarding the heights (in cm) of 50 girls of Class X of a school was conducted and the following data was obtained. Find the mean, median and mode of the given data. [5]

Heights (in cm)	120–130	130–140	140–150	150–160	160–170
No. of girls	4	6	14	18	8

35. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio. [5]

Using the above theorem, prove that a line through the point of intersection of the diagonals and parallel to the base of a trapezium divides the non-parallel sides in the same ratio.

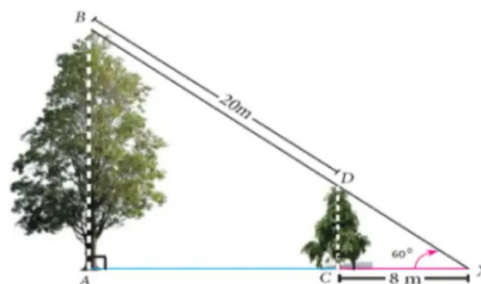
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (Two Trees):

Two trees are standing on flat ground. The angle of elevation of the top of both the trees from a point X on the ground is 60° . The horizontal distance between X and the smaller tree is 8 m and the distance between the tops of the two trees is 20 m. (Take $\sqrt{3} = 1.73$)



- (i) Calculate the distance between the point X and the top of the smaller tree. [1]
- (ii) Calculate the horizontal distance between the two trees. [1]
- (iii) (a) Find the height of the big tree. [2]

OR

(iii) (b) Find the height of the small tree.

37. Case Study – 2 (The Juice Seller):

A juice seller is serving his customers using a cylindrical container of radius 20 cm and height 50 cm. He serves the juice in glasses as shown in the figure. The inner diameter of the cylindrical glass is 5 cm, but the bottom of the glass has a hemispherical raised portion which reduces the capacity of the glass. The height of a glass is 10 cm. (Use $\pi = 3.14$)



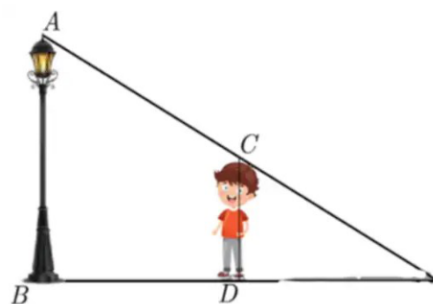
- (i) Find the apparent capacity of the glass. [1]
- (ii) Also find its actual capacity. [1]
- (iii) (a) Find the capacity of the container in litres. [2]

OR

(iii) (b) How many glasses can he serve if the container is full?

38. Case Study – 3 (The Lamp Post):

Priyanshu is very intelligent in maths. He always tries to relate the concepts of maths to daily life. One day he is walking away from the base of a lamp post at a speed of 1 m/s. The lamp is 4.5 m above the ground.



- (i) If after 2 seconds the length of his shadow is 1 m, what is the height of Priyanshu? [1]
- (ii) After how many seconds will the length of his shadow become equal to his height? [1]
- (iii) (a) What is the distance of Priyanshu from the pole at this point? [2]

OR

- (iii) (b) What will be the length of his shadow after 4 seconds?

———— All the Best ————

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SAMPLE PAPER 09 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	1	2	3	–	–	6
Polynomials	1	–	–	–	4	5
Pair of Linear Equations	1	–	–	5	–	6
Quadratic Equations	1	–	3	–	–	4
Arithmetic Progressions	2	–	3	–	–	5
Triangles	3	–	–	5	–	8
Coordinate Geometry	2	4	–	–	–	6
Circles	2	2	3	–	–	7
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	–	–	–	5	–	5
Areas Related to Circles	–	–	–	5	–	5
Surface Areas and Volumes	1	–	–	–	4	5
Statistics	2	–	3	–	–	5
Probability	2	–	–	–	4	6
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 09**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
5. **Section C** – 6 Short Answer questions of **3 marks** each.
6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub–parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub–part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

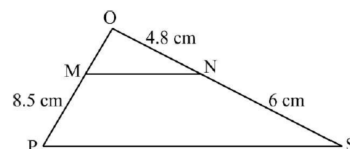
1. If $x = 2$ is a solution of the quadratic equation $2x^2 + (k - 3)x + 6 = 0$, then the value of k is:
 (a) 4 (b) –4
 (c) 8 (d) –8
2. The pair of equations $x = 2a$ and $y = 3b$ ($a, b \neq 0$) graphically represents straight lines which are:
 (a) coincident (b) parallel
 (c) intersecting at $(2a, 3b)$ (d) intersecting at $(3b, 2a)$

3. The perimeters of two similar triangles ABC and PQR are 45 cm and 60 cm respectively. $\frac{PQ}{AB}$ is equal to

- (a) $\frac{3}{4}$ (b) $\frac{9}{16}$
(c) $\frac{16}{9}$ (d) $\frac{4}{3}$

4. In the given figure, if M and N are points on the sides OP and OS respectively of $\triangle OPS$, such that $MN \parallel PS$, then the length of OP is:

- (a) 6.8 cm (b) 17 cm
(c) 15.3 cm (d) 9.6 cm



5. The point on the x -axis which is equidistant from the points $(6, -2)$ and $(3, 4)$ is:

- (a) $(2.5, 0)$ (b) $(5, 0)$
(c) $(-2.5, 0)$ (d) $(0, 2.5)$

6. The 7th term from the end of the A.P. $5, 9, 13, \dots, 81$ is:

- (a) 57 (b) 61
(c) 53 (d) 65

7. After an examination, a teacher wants to know the marks obtained by the maximum number of the students in her class. She requires to calculate of marks.

- (a) median (b) mode
(c) mean (d) range

8. Two positive integers m and n are expressed as $m = p^4 q^2$ and $n = p^2 q^3$, where p and q are prime numbers. The LCM of m and n is:

- (a) $p^6 q^5$ (b) $p^2 q^2$
(c) $p^4 q^2 + p^2 q^3$ (d) $p^4 q^3$

9. If $\tan \theta + \cot \theta = 2$, then $\tan^2 \theta + \cot^2 \theta =$

- (a) 1 (b) 4
(c) 2 (d) 0

10. All the red face cards (the kings, queens and jacks of hearts and diamonds) are removed from a pack of 52 playing cards. The remaining cards are well shuffled and one card is picked at random. The probability of that card being a king is:

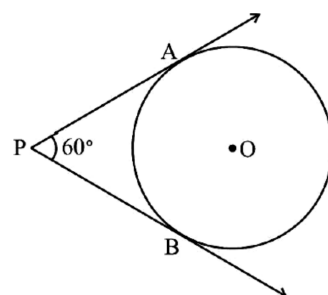
- (a) $\frac{1}{13}$ (b) $\frac{3}{23}$
(c) $\frac{2}{13}$ (d) $\frac{1}{23}$

11. The zeroes of the polynomial $x^2 + px + q$ are twice the zeroes of the polynomial $2x^2 - 7x + 3$. The value of p is:

- (a) -7 (b) 7
(c) $\frac{7}{2}$ (d) $-\frac{7}{2}$

12. In the given figure, PA and PB are two tangents drawn to the circle with centre O and radius 5 cm. If $\angle APB = 60^\circ$, then the length of PA is:

- (a) $\frac{5}{\sqrt{3}}$ cm (b) $5\sqrt{3}$ cm
(c) $\frac{10}{\sqrt{3}}$ cm (d) 10 cm



13. If each observation in a data is multiplied by 3, then the median of the new data:

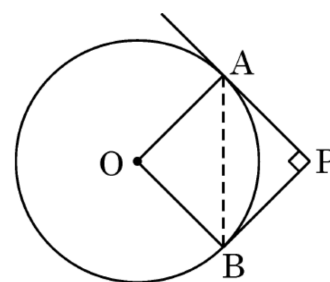
- (a) increases by 3 (b) is divided by 3
(c) is multiplied by 3 (d) remains the same

14. Two dice are rolled simultaneously. What is the probability that the product of the two numbers is 12?

- (a) $\frac{1}{9}$ (b) $\frac{1}{12}$
(c) $\frac{1}{6}$ (d) $\frac{5}{36}$

15. In the given figure, tangents PA and PB to the circle centred at O , from the point P , are perpendicular to each other. If $PA = 5$ cm, then the length of AB is equal to:

- (a) 5 cm (b) $5\sqrt{2}$ cm
(c) $2\sqrt{5}$ cm (d) 10 cm



16. $XOYZ$ is a rectangle with vertices $X(-5, 0)$, $O(0, 0)$, $Y(0, 12)$ and $Z(x, y)$. The length of each of its diagonals is:

- (a) 12 units (b) 17 units
(c) 5 units (d) 13 units

17. Which term of the A.P. $-21, -18, -15, \dots, 48$ is 15?

- (a) 12th (b) 14th
(c) 13th (d) 25th

18. In $\triangle ABC$, $DE \parallel BC$. If $AD = 3$ cm, $DB = 6$ cm and $AE = 2$ cm, then EC is

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

19. **Assertion (A):** If $\sin A = \frac{1}{3}$ ($0^\circ < A < 90^\circ$), then the value of $\cos A$ is $\frac{2\sqrt{2}}{3}$.

Reason (R): The sine and the cosine of an acute angle are both less than 1.

- (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false (d) A is false but R is true

20. **Assertion (A):** Two cubes each of edge 5 cm are joined end to end. The total surface area of the newly formed cuboid is 250 cm^2 .

Reason (R): The newly formed cuboid has 10 square faces, each of area 25 cm^2 .

- (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false (d) A is false but R is true

SECTION B

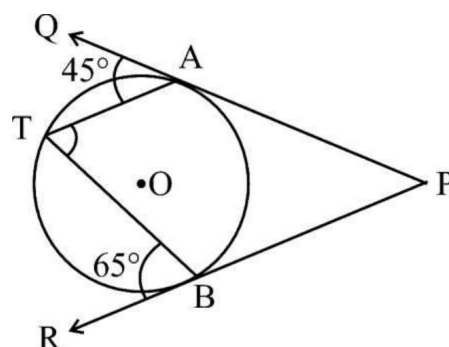
5 × 2 = 10 marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

21. If $\sec(A + B) = 2$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0^\circ < A + B \leq 90^\circ$ and $A > B$, then find the measures of angles A and B . [2]

OR
Find an acute angle θ when $\frac{\sin \theta + \cos \theta}{\sin \theta - \cos \theta} = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}$.

22. In the given figure, PAQ and PBR are tangents to the circle with centre O at the points A and B respectively. If T is a point on the circle such that $\angle QAT = 45^\circ$ and $\angle TBR = 65^\circ$, then find $\angle ATB$. [2]



23. (a) In what ratio is the line segment joining the points $(2, -3)$ and $(-4, 5)$ divided by the line $y = x$? [2]

OR

- (b) $A(1, 2)$, $B(1, -1)$ and $C(-5, 4)$ are the vertices of a triangle ABC . Find the length of its median BE .

24. Given that $\sqrt{3}$ is irrational, prove that $6 + 5\sqrt{3}$ is irrational. [2]

25. Find the type of triangle ABC formed by the vertices $A(2, 0)$, $B(-4, 0)$ and $C(-1, 3\sqrt{3})$. [2]

SECTION C

6 × 3 = 18 marks

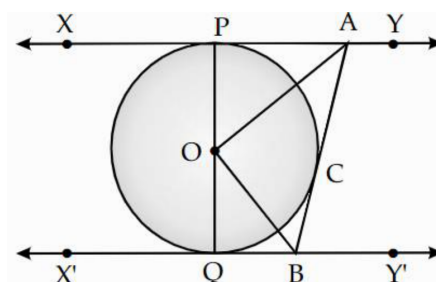
This section has 6 Short Answer (SA-II) questions of 3 marks each.

26. In a teachers' workshop, the numbers of teachers teaching French, Hindi and English are 36, 60 and 84 respectively. Find the minimum number of rooms required if in each room the same number of teachers are seated and all of them are of the same subject. [3]

27. Prove that a parallelogram circumscribing a circle is a rhombus. [3]

OR

In the figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects XY at A and $X'Y'$ at B . What is the measure of $\angle AOB$?



28. Prove that: $\frac{\tan^3 \theta}{1 + \tan^2 \theta} + \frac{\cot^3 \theta}{1 + \cot^2 \theta} = \sec \theta \operatorname{cosec} \theta - 2 \sin \theta \cos \theta$ [3]

29. The government rescued 100 people after a train accident. Their ages were recorded in the following table. Find their mean age. [3]

Age (in years)	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Number of people	7	13	19	24	20	11	6

30. If Nidhi were 4 years younger than what she actually is, then the square of her age (in years) would be 4 more than 5 times her actual age. What is her present age? [3]

31. (a) If the sum of the first m terms of an A.P. is the same as the sum of its first n terms ($m \neq n$), then show that the sum of its first $(m + n)$ terms is zero. [3]

OR

(b) In an A.P., the sum of three consecutive terms is 30 and the sum of their squares is 308. Find the numbers.

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. An arc of a circle of radius 14 cm subtends an angle of 90° at the centre. Find (i) the length of the arc (ii) the area of the minor segment of the circle made by the corresponding chord. (Use $\pi = \frac{22}{7}$) [5]

33. A pole 24 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point P on the ground is 60° and the angle of depression of the point P from the top of the tower is 30° . Find the height of the tower and the distance of the point P from the foot of the tower. (Use $\sqrt{3} = 1.73$) [5]

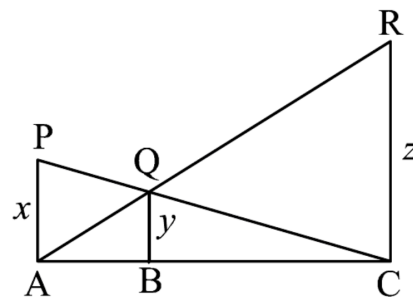
34. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio. [5]

Using the above theorem, prove that a line through the point of intersection of the diagonals and parallel to the base of a trapezium divides the non-parallel sides in the same ratio.

OR

In the given figure, PA , QB and RC are each perpendicular to AC . If $AP = x$, $BQ = y$ and $CR = z$, then prove that

$$\frac{1}{x} + \frac{1}{z} = \frac{1}{y}.$$



35. (a) Using the graphical method, solve the following system of equations: $2x + y - 6 = 0$ and $2x - y - 2 = 0$. [5]

OR

(b) Tara scored 30 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Tara would have scored 34 marks. Assuming that Tara attempted all the questions, find the total number of questions in the test.

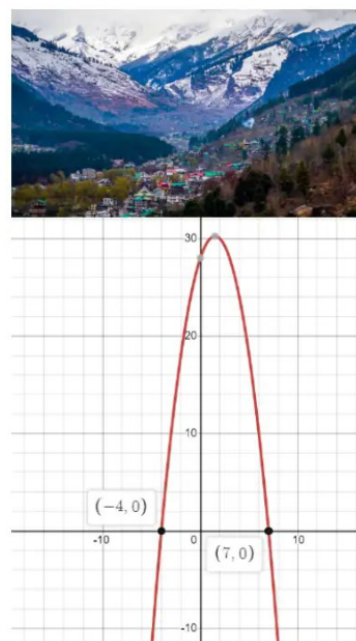
SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (The Trekking Path):

Two friends Govind and Pawan decided to go for trekking. During summer vacation, they went to Panchmarhi. While trekking they observed that the trekking path is in the shape of a parabola. The mathematical representation of the track is shown in the graph.



- (i) What are the zeroes of the polynomial whose graph is given? [1]
 (ii) Write the quadratic polynomial $p(x)$ represented by the graph, if its leading coefficient is -1 . [1]
 (iii) (a) What is the product of the zeroes of the polynomial which represents the parabola? [2]

OR

(iii) (b) In the standard form $ax^2 + bx + c$ of the polynomial found in (ii), what are a , b and c ?

37. Case Study – 2 (The Rolling Pin):

A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood — two small ones on the ends and one larger in the centre — to create a perfect tool. The baker loved the rolling pin, as it rolled out the smoothest dough for breads and pastries. The length of the bigger cylindrical part is 12 cm and its diameter is 7 cm, and the length of each smaller cylindrical part is 5 cm and its diameter is 2.1 cm. (Use $\pi = \frac{22}{7}$)



- (i) Find the volume of the bigger cylindrical part. [1]
 (ii) Find the curved surface area of the bigger cylindrical part. [1]
 (iii) (a) Find the ratio of the volume of the bigger cylindrical part to the total volume of the two smaller (identical) cylindrical parts. [2]

OR

(iii) (b) Find the sum of the curved surface areas of the two identical smaller cylindrical parts.

38. Case Study – 3 (Ashima and the Toffees):

Aarav and Ashima are brother and sister and on Ashima's birthday, Aarav gifts her a bag filled with 8 red toffees, 10 green toffees and 6 blue toffees. Ashima decides to randomly draw a toffee from the bag. She wants to find the chances of picking a toffee of a specific colour and asks the following questions:

- (i) What is the probability of getting a green toffee? [1]
 (ii) What is the probability of getting a blue toffee? [1]
 (iii) (a) What is the probability of getting a non-red toffee? [2]

OR

(iii) (b) What is the probability of getting a red or a green toffee?

———— All the Best ————

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SAMPLE PAPER 10 – BLUEPRINT**Session 2026–27****About this paper**

A full-length board-level paper (80 marks, 3 hours) in the latest CBSE pattern. The chapter-wise and section-wise marks of this paper are shown below.

Chapter-wise & Section-wise Marks Distribution (Blueprint)

Chapter	A	B	C	D	E	Total
Real Numbers	1	2	3	–	–	6
Polynomials	3	–	–	–	–	3
Pair of Linear Equations	1	2	3	–	–	6
Quadratic Equations	1	–	–	–	4	5
Arithmetic Progressions	1	–	–	5	–	6
Triangles	–	2	–	5	–	7
Coordinate Geometry	3	–	3	–	–	6
Circles	1	–	3	–	4	8
Introduction to Trigonometry	2	2	3	–	–	7
Some Applications of Trigonometry	–	–	–	5	–	5
Areas Related to Circles	–	–	–	5	–	5
Surface Areas and Volumes	2	–	3	–	–	5
Statistics	2	–	–	–	4	6
Probability	3	2	–	–	–	5
TOTAL	20	10	18	20	12	80

Unit-wise Marks in this Paper

Number Systems 06	Algebra 20	Coordinate Geometry 06
Geometry 15	Trigonometry 12	Mensuration 10
Statistics & Probability 11	Grand Total 80 marks	

Section A: MCQ & Assertion–Reason (1) • B: SA–I (2) • C: SA–II (3) • D: LA (5) • E: Case Study (4)

SAMPLE QUESTION PAPER – 10**Session 2026–27**

Class : X	Subject : Mathematics	Time : 3 Hours	M.M. : 80
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General Instructions

1. This question paper contains **38 questions**. All questions are compulsory.
2. The paper is divided into **five Sections** – A, B, C, D and E.
3. **Section A** – Q.1 to Q.18 are MCQs and Q.19 to Q.20 are Assertion–Reason based questions of **1 mark** each.
4. **Section B** – 5 Very Short Answer questions of **2 marks** each.
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6. **Section D** – 4 Long Answer questions of **5 marks** each.
7. **Section E** – 3 Case Study based questions of **4 marks** each with sub–parts.
8. **Internal choice** is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in one sub–part of each case study of Section E.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated. **Use of calculators is not allowed.**

SECTION A**20 × 1 = 20 marks**

This section has 20 questions of 1 mark each — Q.1 to Q.18 are MCQs and Q.19–Q.20 are Assertion–Reason based.

1. Let a and b be two positive integers such that $a = p^4q^3$ and $b = p^2q^5$, where p and q are prime numbers. If $\text{HCF}(a, b) = p^m q^n$ and $\text{LCM}(a, b) = p^r q^s$, then $(m + n)(r + s) =$

(a) 35 (b) 54

(c) 72 (d) 45

2. If the probability of a player winning a game is 0.64, then the probability of his losing the same game is:

(a) 1.64 (b) 0.36

(c) 0.64 (d) 0.46

3. The value of $\frac{1}{1 + \tan^2 \theta} + \frac{1}{1 + \cot^2 \theta}$ is:

- (a) 0 (b) 2
(c) 1 (d) -1

4. From the data 3, 6, 9, 13, 15, 18, 19, if all the even numbers are removed, then the probability of getting at random a prime number from the remaining is:

- (a) $\frac{3}{5}$ (b) $\frac{2}{5}$
(c) $\frac{1}{5}$ (d) $\frac{3}{7}$

5. For the following distribution:

Class	0–10	10–20	20–30	30–40	40–50
Frequency	12	16	14	11	7

the sum of the lower limits of the median class and the modal class is:

- (a) 30 (b) 20
(c) 40 (d) 50

6. AD is a median of $\triangle ABC$ with vertices $A(7, -2)$, $B(6, 8)$ and $C(0, 0)$. Length AD is equal to:

- (a) $\sqrt{52}$ units (b) $2\sqrt{15}$ units
(c) $\sqrt{101}$ units (d) 10 units

7. If α and β are the zeroes of the polynomial $f(x) = px^2 - 5x + 2p$ and $\alpha + \beta = \alpha\beta$, then p is:

- (a) $\frac{2}{5}$ (b) $-\frac{5}{2}$
(c) $\frac{5}{2}$ (d) 2

8. Let p be a prime number. The quadratic equation having its roots as factors of p is:

- (a) $x^2 - px + p = 0$ (b) $x^2 - (p + 1)x + p = 0$
(c) $x^2 + (p + 1)x + p = 0$ (d) $x^2 - px + p + 1 = 0$

9. The volume of the largest right circular cone that can be carved out from a solid cube of edge 6 cm is:

- (a) 36π cu cm (b) 54π cu cm
(c) 18π cu cm (d) 9π cu cm

10. The probability of getting a chocolate flavoured ice cream at random, in a lot of 800 ice creams, is 0.045. The number of chocolate flavoured ice creams in the lot is:

- (a) 40 (b) 32
(c) 45 (d) 36

11. If the vertices of a parallelogram PQRS taken in order are $P(5, 3)$, $Q(1, 5)$ and $R(-3, 1)$, then the coordinates of its fourth vertex S are:

- (a) $(-1, 1)$ (b) $(1, -1)$
(c) $(9, -1)$ (d) $(1, 1)$

12. In an A.P., if the first term $a = 5$, the n th term $a_n = 95$ and the sum of the first n terms $S_n = 1500$, then n is equal to:

- (a) 28 (b) 32
(c) 25 (d) 30

13. If α and β are the zeroes of the polynomial $3x^2 + 7x - 4$, the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is:

- (a) $\frac{7}{4}$ (b) $-\frac{7}{4}$
(c) $\frac{4}{7}$ (d) $-\frac{4}{7}$

14. If the distance between the points $(-2, 4)$ and $(x, 4)$ is 9 units, then the values of x are:

- (a) 7, 11 (b) $-7, 11$
(c) 7, -11 (d) 9, -9

15. The sum of the length, breadth and height of a cuboid is 10 cm and the length of its diagonal is 6 cm. The total surface area of the cuboid is:

- (a) 64 cm^2 (b) 100 cm^2
(c) 136 cm^2 (d) 36 cm^2

16. If the difference of the mode and the median of a data is 18, then the difference of the median and the mean is:

- (a) 18 (b) 6
(c) 36 (d) 9

17. If $2 \tan \beta = 3$, then $\frac{2 \sin \beta + \cos \beta}{2 \sin \beta - \cos \beta} =$

- (a) $\frac{1}{2}$ (b) 2
(c) 4 (d) 3

18. If the system of equations $3x + 2y = 7$ and $(k + 1)x + (k - 1)y = 4k$ is inconsistent, then $k =$

- (a) 2 (b) 3
(c) 5 (d) 7

19. **Assertion (A):** The tangents drawn at the end points of a diameter of a circle are parallel.

Reason (R): The diameter of a circle is the longest chord.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. **Assertion (A):** If the graph of a polynomial touches the x -axis at only one point, then the polynomial cannot be a quadratic polynomial.

Reason (R): A polynomial of degree n ($n > 1$) can have at most n zeroes.

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

$5 \times 2 = 10$ marks

This section has 5 Very Short Answer (SA-I) questions of 2 marks each.

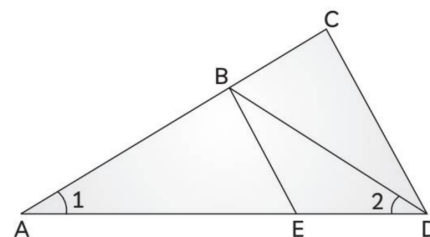
21. Solve for x and y : $37x + 43y = 203$, $43x + 37y = 197$. [2]

22. (a) If $\cos(A + B) = 0$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, where $0 \leq A + B \leq 90^\circ$, then find the value of $\sec(2A - 3B)$. [2]

OR

(b) Find the value of x such that $5 \tan^2 60^\circ - x \sin^2 45^\circ + \frac{3}{4} \sec^2 30^\circ = 2 \operatorname{cosec}^2 30^\circ$.

23. In the figure below, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$. Show that $\triangle BAE \sim \triangle CAD$. [2]



24. Can the number 12^n , n being a natural number, end with the digit 0? Give reasons. [2]

OR

Show that $7 \times 13 \times 17 + 13$ is a composite number.

25. In a pack of 52 playing cards one card is lost. From the remaining cards, a card is drawn at random. Find the probability that the drawn card is a queen, if the lost card is a king. [2]

SECTION C

$6 \times 3 = 18$ marks

This section has 6 Short Answer (SA–II) questions of 3 marks each.

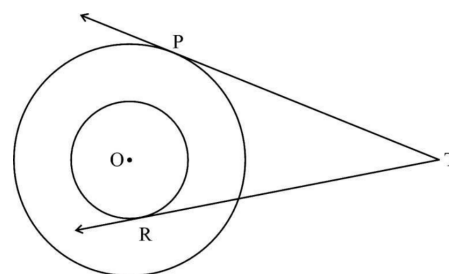
26. Prove that $\sqrt{17}$ is an irrational number. [3]

27. A train covered a certain distance at a uniform speed. If the train had been 8 km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 8 km/h, it would have taken 3 hours more than the scheduled time. Find the length of the journey. [3]

28. (a) If a hexagon $PQRSTU$ circumscribes a circle, prove that $PQ + RS + TU = QR + ST + UP$. [3]

OR

(b) In the figure, two concentric circles have radii 6 cm and 10 cm. Two tangents TR and TP are drawn to the circles from an external point T such that TR touches the inner circle at R and TP touches the outer circle at P . If $TR = 10$ cm, then find the length of TP .



29. Prove that: $\frac{1 + \tan^2 A}{1 + \cot^2 A} = \left(\frac{1 - \tan A}{1 - \cot A} \right)^2$ [3]

30. Find the ratio in which the point $\left(\frac{18}{5}, y\right)$ divides the line segment joining the points $(2, 1)$ and $(6, 5)$. Also, find the value of y . [3]

OR

$ABCD$ is a rectangle formed by the points $A(-2, -1)$, $B(-2, 7)$, $C(4, 7)$ and $D(4, -1)$. P , Q , R and S are the mid-points of the sides AB , BC , CD and DA respectively. Show that the diagonals of the quadrilateral $PQRS$ bisect each other.

31. Due to heavy floods in a state, thousands were rendered homeless. 25 schools collectively decided to provide place and the canvas for 600 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.1 m and height 3 m, and the upper part is conical with the same base radius but of height 2.8 m. If the canvas used to make the tents costs Rs. 140 per m^2 , find the amount shared by each school to set up the tents. (Use $\pi = \frac{22}{7}$) [3]

SECTION D

$4 \times 5 = 20$ marks

This section has 4 Long Answer (LA) questions of 5 marks each.

32. The sum of the first and eighth terms of an increasing A.P. is 20 and their product is 51. Find the first term and the common difference of the A.P. Hence, also find the sum of its first 20 terms. [5]

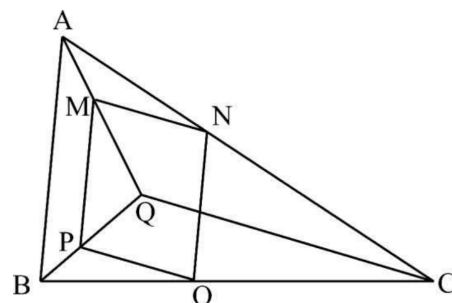
OR

In an A.P. of 30 terms, the sum of the first 7 terms is 112 and the sum of the last 5 terms is 560. Determine the first term and the common difference of the A.P. Also, find the sum of all the terms of the A.P.

33. (a) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. [5]

OR

- (b) In the figure, $MNOP$ is a parallelogram and $AB \parallel MP$. Prove that $QC \parallel PO$.



34. From the top of a 60 m high lighthouse, the angles of depression of two ships, on the opposite sides of it, are observed to be 30° and 60° . If the line joining the ships passes through the foot of the lighthouse, find the distance between the ships. (Use $\sqrt{3} = 1.73$) [5]

35. The perimeter of a certain sector of a circle of radius 3.5 m is 15 m. Find the area of the sector. [5]

SECTION E

$3 \times 4 = 12$ marks

This section has 3 Case Study based questions of 4 marks each.

36. Case Study – 1 (The Garden Walkway):

A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn and the walkway is 360 square metres. The width of the walkway is the same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres.

- (i) Formulate the quadratic equation representing the total area of the lawn and the walkway, taking the width of the walkway as x m. [1]
- (ii) (a) Solve the quadratic equation to find the width of the walkway x . [2]

OR

(ii) (b) If the cost of paving the walkway at the rate of Rs. 50 per square metre is Rs. 12,000, calculate the area of the walkway.

- (iii) Find the perimeter of the lawn. [1]

37. Case Study – 2 (Heights of the Students):

Under the physical and health education programme, a medical check-up was conducted in a Vidyalaya to improve the health and fitness of the students. The heights of 50 students were recorded as given in the table below:

Height (in cm)	135–140	140–145	145–150	150–155	155–160	160–165	165–170
Number of students	2	8	10	15	6	5	4

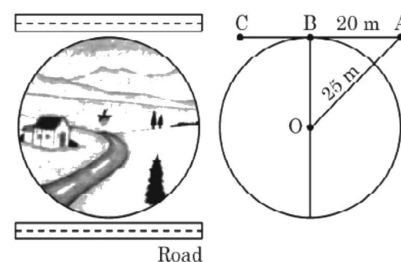
- (i) Find the lower limit of the modal class. [1]
- (ii) Find the median class. [1]
- (iii) (a) Find the median of the given data. [2]

OR

(iii) (b) Find the mode of the given data.

38. Case Study – 3 (The Circular Village):

People of a circular village Dharamkot want to construct a road nearest to it. The road cannot pass through the village, but the people want the road at the shortest distance from the centre of the village. Suppose the road starts from A, which is outside the circular village (as shown in the figure), and touches the boundary of the circular village at B such that $AB = 20$ m. Also, the distance of the point A from the centre O of the village is 25 m. (Use $\pi = 3.14$)



- (i) If B is the mid-point of AC , find the distance AC . [1]
- (ii) Find the shortest distance of the road from the centre of the village. [1]
- (iii) (a) Find the circumference of the village. [2]

OR

(iii) (b) Find the area of the village.

———— **All the Best** ————

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Notes & formulas to remember

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