ST. MARTIN'S DIOCESAN SCHOOL
DELHI CANTT.
PRE-BOARD EXAMINATION (2025-2026)
CLASS: X
SUBJECT: MATHEMATICS (041)
SET I

**DURATION: 03 HOURS**   **M.M: 80**
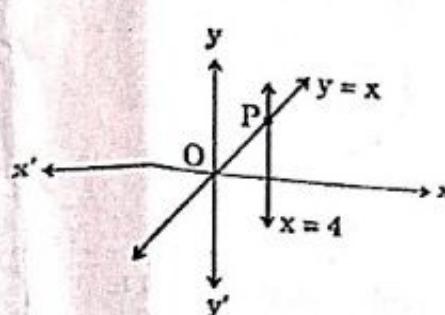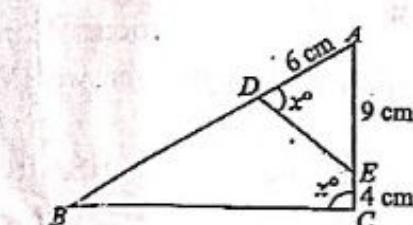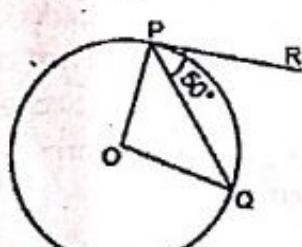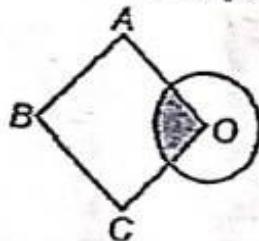
General Instructions:
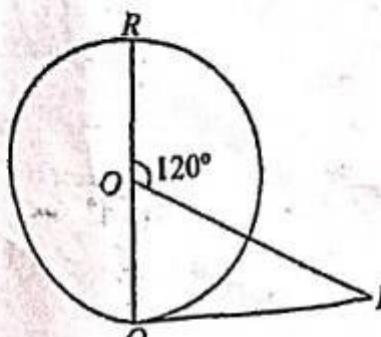
Read the following instructions carefully and follow them:

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

Q.No.	SECTION-A	Marks
	Section A has 20 MCQs carrying 1 mark each	
1	What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes? (a) 17 m/min (b) 19 m/min (c) 23 m/min (d) 13 m/min	1
2	If the roots of equation $ax^2 + bx + c = 0, a \neq 0$ are real and equal, then which of the following relation is true? (a) $c = \dfrac{b^2}{a}$ (b) $ac = \dfrac{b^2}{4}$ (c) $a = \dfrac{b^2}{c}$ (d) $b^2 = ac$	1
3	Sec θ when expressed in terms of cot θ, is equal to (a) $\dfrac{1 + \cot^2\theta}{\cot\theta}$ (b) $\dfrac{\sqrt{1 + \cot^2\theta}}{\cot\theta}$ (c) $\dfrac{\sqrt{1 - \cot^2\theta}}{\cot\theta}$ (d) $\dfrac{1 - \cot^2\theta}{\cot\theta}$	1

4	A quadratic polynomial, the sum of whose zeroes is 0 and one zero is 4, is	1
	(a) $x^2 - 16$ (b) $x^2 + 16$ (c) $x^2 + 4$ (d) $x^2 - 4$	
5	The lines represented by the linear equations $y = x$ and $x = 4$ intersect at P. The coordinates of the point P are: (a) (4, 4) (b) (-4, 4) (c) (4, 0) (d) (0, 4)	1
6	In the given figure, AD = 6 cm, AE = 9 cm and EC = 4 cm, then the value of 2BD is (a) 9 (b) 18 (c) 27 (d) 36	1
7	In figure if O is centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, then $\angle POQ$ is equal to (a) 100° (b) 80° (c) 90° (d) 75°	1
8	The pair of equations $2x - 5y + 4 = 0$ and $2x + y - 8 = 0$ has (a) A unique solution (b) Exactly two solutions (c) Infinitely many solutions (d) No solution	1
9	$\dfrac{2\tan 30°}{1 + \tan^2 30°} =$ (a) $\sin 60°$ (b) $\cos 60°$ (c) $\tan 60°$ (d) $\sin 30°$	1
10	The value of k, for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x - ky = 7$ represents parallel lines is: (a) 2 (b) -3 (c) 4 (d) -2	1

11	The 11th term of the AP $-3, -\frac{1}{2}, 2, \ldots$ is:	1
	(a) 22 (b) 28 (c) -38 (d) $48\frac{1}{2}$	
12	If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9; then the probability that this digit is an odd prime number is:	1
	(a) $\frac{4}{9}$ (b) $\frac{1}{3}$ (c) $\frac{5}{9}$ (d) $\frac{2}{3}$	
13	The time, in seconds, taken by 150 athletes to run a 100 m hurdle race are tabulated below:	1

Time (sec.)	13 - 14	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19
Number of Athletes	2	4	5	71	48	20

	The number of athletes who completed the race in less than 17 seconds is	
	(a) 11 (b) 82 (c) 71 (d) 68	
14	The radius of a sphere (in cm) whose volume is $12\pi \ cm^3$, is	1
	(a) 3 (b) $3\sqrt{3}$ (c) $3^{\frac{2}{3}}$ (d) $3^{\frac{1}{3}}$	
15	O is the centre of a circle of diameter 4 cm and OABC is a square, if the shaded area is $\frac{1}{3}$ area of the square, then the side of the square is _____.	1

	(a) $\pi\sqrt{3}$ cm (b) $\sqrt{3\pi}$ cm (c) 3π cm (d) $3\sqrt[3]{\pi}$ cm	
16	The length of the line AB formed by two points $A(4, 10)$ and $B(7, -6)$ is	1
	(a) $\sqrt{256}$ (b) $\sqrt{265}$ (c) $\sqrt{526}$ (d) $\sqrt{625}$	
17	Mean of n numbers $x_1, x_2, \ldots x_n$ is m. If x_n is replaced by x, then new mean is	1
	(a) $m - x_n + x$ (b) $\frac{nm - x_n + x}{n}$ (c) $\frac{(n-1)m + x}{n}$ (d) $\frac{m - x_n + x}{n}$	
18	LCM of 6, 72 and 120 is	1
	(a) 360 (b) 260 (c) 180 (d) None of these	

ASSERTION-REASON BASED QUESTIONS

Direction: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of reason (R).

Choose the correct option as:

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

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

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

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

19	Assertion (A): Common difference of the A.P. 5, 1, -3, -7 ... is 4. Reason (R): Common difference of the A.P. $a_1, a_2, a_3 ... a_n$ is obtained by $d = a_n - a_{n-1}$.	1
20	Assertion (A): A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter; the diameter of the spherical part is 8.5 cm. By measuring the amount of water it holds, a child finds its volume to be 345 cm³. Reason (R): To calculate the volume of vessel the expression used here is $$V = \pi r^2 h + \frac{4}{3}\pi r^3$$	1

SECTION-B

Section B has 5 questions carrying 02 marks each.

|		
21	Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (–3, 4).	2
22	(A) If α and β are the roots of quadratic equation $2x^2 - 5x + 3 = 0$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$. **OR** (B) Solve the quadratic equation: $x^2 - 2ax + (a^2 - b^2) = 0$ for x.	2
23	Using converse of basic proportionality theorem, prove that the line joining the mid-points of any two sides of a triangle is parallel to the third side.	2
24	(A) From a point 20 m away from the foot of a tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower. **OR** (B) A circus artist is climbing a 20 m long rope, tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground is 30°.	2
25	PQ is a tangent drawn from an external point P to a circle with centre O and QOR is the diameter of the circle. If ∠POR = 120°, find the measure of ∠OPQ. 	2

SECTION-C

Section C has 6 questions carrying 03 marks each

**26** (A) In Fig., DB ‖ AC and DC ‖ AP. Prove that $\dfrac{BB}{EC} = \dfrac{BC}{CP}$.
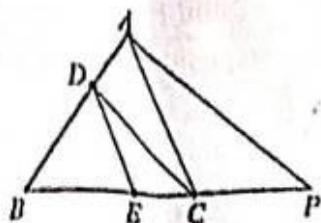
OR

(B) In given figure, if $\triangle ABC \sim \triangle DEF$ and their sides are of lengths (in cm) as marked along them, then find the lengths of the sides of each triangle.
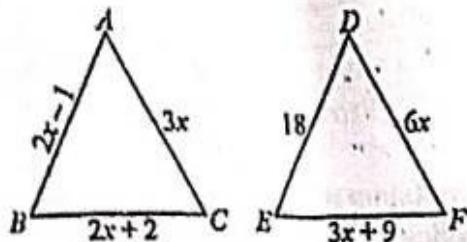
27 In what ratio does the point (24/11, y) divide the line segment joining the points P(2, –2) and Q(3, 7)? Also find the value of y.

28 (a) Find the sum of natural numbers less than 100 which are divisible by 7.

OR

(b) Find the sum of first 25 terms of an A.P., in which the third term is 7 and the seventh term is two more than thrice its third term.

29 Prove that: $\dfrac{2\cos^3\theta - \cos\theta}{\sin\theta - 2\sin^3\theta} = \cot\theta$.

30 National Art Convention got registrations from students interested in music, dance, and handicrafts: 60, 84, and 108 respectively. Organisers wish to keep each group consisting of students interested in the same art form and equal number of students in each group. Find the number of groups and how many rooms are required.

31 Solve the following quadratic equation: $6a^2x^2 - 7abx - 3b^2 = 0$.

SECTION-D

Section D has 4 questions carrying 05 marks each

32 (A) Two palm trees of equal height are standing opposite each other on either side of the river, which is 80 m wide. From a point O between them on the river, the angles of elevation of the top of the trees are 60° and 30°, respectively.

Find the height of the trees and the distances of the point O from the trees.

OR

(B) A pole 6 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 45°. Find the height of the tower and the distance of point P from the foot of the tower. (Use $\sqrt{3} = 1.73$)

33	If the median of the following frequency distribution is 32.5. Find the values of x and y.	5

Class	Frequency
0-10	x
10-20	5
20-30	9
30-40	12
40-50	y
50-60	3
60-70	2
Total	40

34	If from an external point B of a circle with centre O two tangents, BC and BD are drawn such that $\angle DBC = 120°$. Prove that $BC + BD = BO$, i.e, $BO = 2BC$.	5

OR

In figure, PQ and RS are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting PQ at A and RS at B. Prove that $\angle AOB = 90°$.
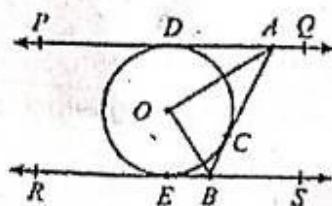
| 35	The internal and external diameters of a hollow hemispherical vessel are 14 cm and 18 cm respectively. If the cost of painting 1 cm² of the surface area is Rs 5, find the total cost of painting the vessel all over. (Use $\pi = 3.14$)	5

SECTION-E

Case Study based questions are compulsory

36	Rahul and Ravi planned to play Business (board game) in which they were supposed to use two dice. Based on your understanding of the concept of probability answer the following:	

(i)	Ravi got first chance to roll the dice twice. What is the probability that the sum of	1

	two numbers appearing on the top faces is 8?	
(ii)	Rahul got next chance to roll the dice twice. What is the probability that the sum of two numbers appearing on the top faces is 12?	1
(iii)	Now it was Ravi's turn. He rolled the dice twice. What is the probability that the sum of the two numbers appearing on the top face is greater than or equal to 6?	2
37	A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters dividing the circle into 10 equal sectors. 	5.4
(i)	Find the central angle of each sector.	1
(ii)	Find the length of the arc ACB.	1
(iii)	Find the area of each sector of the brooch. OR Find the total length of the silver wire used.	2
38	Raj and Ajay are very close friends. Both their families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/h, while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete the journey of 400 km.	
(i)	What will be the distance covered by Ajay's car in two hours?	1
(ii)	Find the quadratic equation.	1
(iii)	What is the speed of Raj's car? OR How much time did Ajay take to travel 400 km?	2
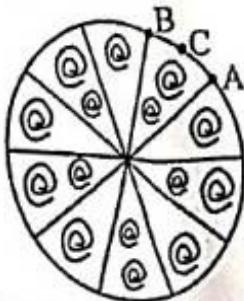
ARMY PUBLIC SCHOOL SHANKAR VIHAR
CLASS X   2024-25   PREBOARD 1
### Subject- Mathematics (Standard) (041)

Time Allowed: 3 hours

Maximum Marks – 80

General Instructions:

1. **This Question Paper has 5 Sections A-E. Total number of pages is 5**
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each).
7. All Questions are compulsory. However, internal choices have been provided.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION A (1 MARK EACH)

|	
1.	If the LCM of 12 and 42 is 10m + 4 then the value of m is (a) 50 (b) 8 (c) 15 (d) 1
2.	A quadratic polynomial, whose zeores are -4 and -5, is (a) $x^2 - 9x + 20$ (b) $x^2 + 9x + 20$ (c) $x^2 - 9x - 20$ (d) $x^2 + 9x - 20$
3.	The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have infinitely many solutions is (a) 3 (b) -3 (c) -12 (d) no value
4.	The graph of a polynomial p(x) cuts the X – axis at three points and touches it at two other points. The number of zeros of p(x) is (a) 1 (b) 2 (c) 3 (d) 5
5.	The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observations of the set is increased by 2, then the median of the new set (a) is increased by 2 (b) is decreased by 2 (c) is two times the original number (d) Remains same as that of original observations
6.	What is the greatest possible speed at which a girl can walk 95m and 171m in an exact number of minutes? (a) 17 m/min (b) 19 m/min (c) 23 m/min (d) 13 m/min
7.	In ∠BAC = 90° and AD ⊥ BC. Then (a) BD.CD = BC² (b) AB.AC = BC² (c) BD.CD = AD² (d) AB.AC = AD²
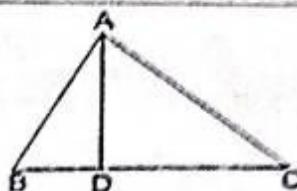
8.	In the given figure, if $BA \perp AC, DC \perp AC$, $AB = 14\ cm$, then the value of tan B is:

(a) $\frac{4}{3}$ (b) $\frac{14}{3}$ (c) $\frac{5}{3}$ (d) $\frac{13}{3}$
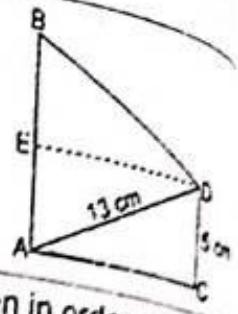
| 9.	If (1, 2), (4, 3), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, then value of x is:

(a) 3   (b) 4   (c) 5   (d) 6

10.	The $(n-1)^{th}$ term of an A.P. is given by 7,12,17, 22,... is

(a) 5n + 2   (b) 5n + 3   (c) 5n – 5   (d) 5n – 3

11.	In given figure, if PQR is the tangent to a circle at O, AB is a chord parallel to PR and $\angle BQR = 70°$ then $\angle AQB$ is equal to

(a) 20°   (b) 40°   (c) 35°   (d) 45°
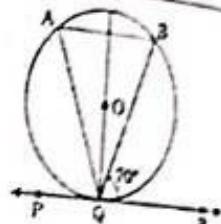
12.	If tan $(3x - 15)° = 1$ then find the value of x will be

(a) 30°   (b) 45°   (c) 20°   (d) 0°

13.	If the roots of $px^2 + qx + 2 = 0$ are reciprocal of each other, then

(a) p = 0   (b) p = -2   (c) p = ±2   (d) p = 2

14.	If the mean of first n natural numbers is $\frac{5n}{9}$, then $n =?$

(a) 6   (b) 7   (c) 9   (d) 10

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

(a) 90°   (b) 50°   (c) 70°   (c) 40°

16.	For the distribution given below, the modal class is

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
Frequency	3	12	27	57	75	80

(a) 20 - 30   (b) 60 -70   (c) 30 - 40   (d) 40 - 50

17.	The probability of guessing the correct answer to a certain question is $\frac{p}{12}$. If the probability of not guessing the correct answer to the same question is $\frac{3}{4}$, the value of p is

(a) 1   (b) 3   (c) 0   (d) 4

18.	If $p\cot\theta = \sqrt{q^2 - p^2}$, then the value of $\sin\theta$ is (θ being an acute angle)

(a) $\frac{q}{3p}$ (b) $\frac{q}{2p}$ (c) $\frac{p}{q}$ (d) 0

Direction – In question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option as -
(a) Both assertion and reason are correct and reason is correct explanation for assertion.
(b) Both assertion and reason are correct but reason is not correct explanation for assertion.
(c) Assertion is correct but reason is false.
(d) Assertion is false and reason is correct.

2

Assertion (A): The point (–1, 6) divides the line segment joining the points (–3, 10) and (6, –8) in the ratio 2 : 7 internally.

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

20. **Assertion(A):** $\sqrt{3}(2 + \sqrt{3})$ is an irrational number.

   **Reason(R):** Product of two irrational numbers is always irrational.

SECTION B (2 MARKS EACH)

21. The students of a class are made to stand in (complete) rows. If one student is extra in a row, there would be 2 rows less, and if one student is less in a row, there would be 3 rows more. Find the number of students in the class.

OR

Two pens and one eraser cost Rs. 35 and 3 pencil and four erasers cost Rs. 65. Find the cost of pencil and eraser separately.

22. Prove that a parallelogram circumscribing a circle (with center O) is a rhombus.

23. Evaluate $2 \sin 30° \tan 60° - 3 \cos^2 60° \sec^2 30°$

OR

If $\sin x = \frac{7}{25}$, where x is an acute angle, then find the value of $\sin x . \cos x (\tan x + \cot x)$.

24. If $\sqrt{3}$ is an irrational number, prove that $\frac{\sqrt{3}}{2} + 5$ *is an irrational number.*

25. AC and AD are tangents at C and D, respectively. If ∠BCD = 44°, then find ∠CAD, ∠ADC, ∠CBD and ∠ACD.
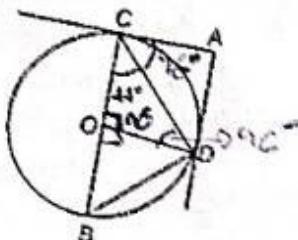
SECTION C (3 MARKS EACH)

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

27. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are equal, then prove that either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$

OR

If the zeroes of the polynomial $x^2 + px + q$ are double that of the polynomial $2x^2 - 5x - 3$, find the values of p and q.
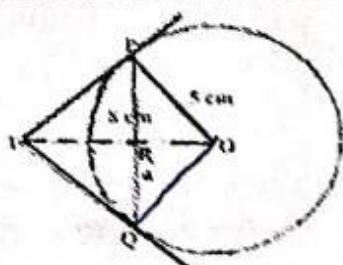
28	In Figure, from a cuboidal solid metallic block, of dimensions 15 cm × 10 cm × 5 cm, a cylindrical hole of diameter 7 cm is drilled out. Find the surface area of the remaining block.	7 cm 15 cm
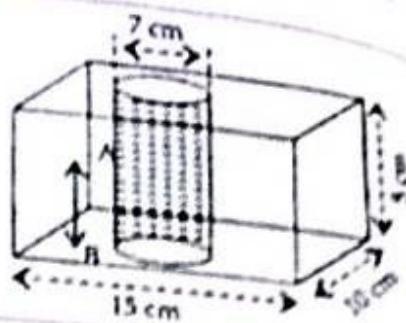
29	In figure, APB and AQO are semicircle, and AO = OB. If the perimeter of the given figure is 40 cm, find the area of the shaded region.
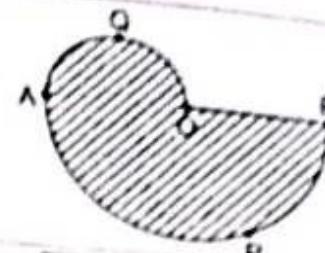
30	If $tanA + sinA = m$ and $tanA - sinA = n$, show that $m^2 - n^2 = 4\sqrt{mn}$ OR If θ is an acute angle and $\frac{cos\theta - sin\theta}{sin\theta + cos\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$, find θ

| 31	A bag contains 12 balls out of which x are white. (i) If one ball is drawn at random, what is the probability that it will be a white ball? (ii) If 6 more white balls are put in the bag, the probability of drawing a white ball will be double than that in part (i) Find x.

SECTION-D (5 marks each)

32	A train travels 360 km at a uniform speed. If the speed has been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train. OR A two-digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

33 (a)	Two triangles ΔBAC and ΔBDC, right angled at A and D respectively are drawn on the same base BC and on the same side of BC. If AC and DB intersect at P, then prove that AP × PC = DP × PB.
(b)	In the given figure, $\angle A = 90°$, AD ⊥ BC. If BD = 2 cm and CD = 8 cm, find AD
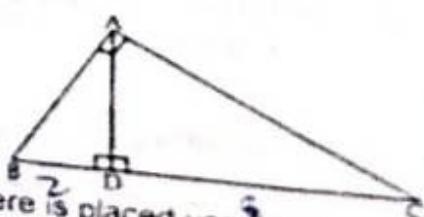
34	A solid composed of a right circular cone mounted on a hemisphere is placed upright inside a right circular cylinder completely filled with water, such that the solid touches the bottom of the cylinder. Determine the volume of water remaining in the cylinder if the cylinder has a radius of 60 cm and a height of 180 cm, the hemisphere has a radius of 60 cm and the cone (sharing the same base as the hemisphere) has a height of 120 cm

Find the missing frequencies f_1 and f_2 in the following frequency distribution table, if N = 100 and median is 32.

OR

Class	Frequency
0-10	10
10-20	f_1
20-30	25
30-40	30
40-50	f_2
50-60	10

A medical camp was held in a school to impart health education and the importance of excercise to children. During this camp, a medical check of 35 students was done and their weights were recorded as follows :-Compute the modal weight.

Weight (in kg)	No. of Students
below 40	3
below 42	5
below 44	9
below 46	14
below 48	28
below 50	31
below 52	35

SECTION-E (4 MARKS EACH)

36. The School Auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.

    a) If the first circular row has 30 seats, how many seats will be there in the tenth row?

   b) For 1500 seats, how many rows need to be there?

    OR

    If 1500 seats are to be placed in the auditorium, how many seats are still left to be put after the 10th row?

    c) If there were 17 rows in the auditorium, how many seats will be there in the middle row?

    (1+2+1)

37. Tiling or tessellation of a flat surface is the covering of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps.
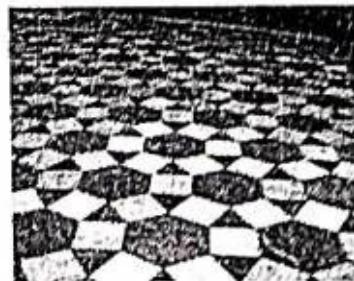
    Historically, tessellations were used in ancient Rome and in Islamic art. You may find tessellation patterns on floors, walls, paintings etc. A tiled floor in the archaeological Museum of Seville (shown in figure) has been made using squares, triangles and hexagons

A craftsman thought of making a floor pattern after being inspired by the above design. To ensure accuracy in his work, he made the pattern on the Cartesian plane. He used regular octagons, squares and triangles for his floor tessellation pattern.

a) What is the length of the line segment joining points B and F?

b) The centre 'Z' in the figure will be the point of intersection of the diagonals of quadrilateral WXOP. Then what are the coordinates of Z?

c) What are the coordinates of the point on y-axis equidistant from A and G?

OR

What is the area of trapezium AFGH?

(1+2+1)

---
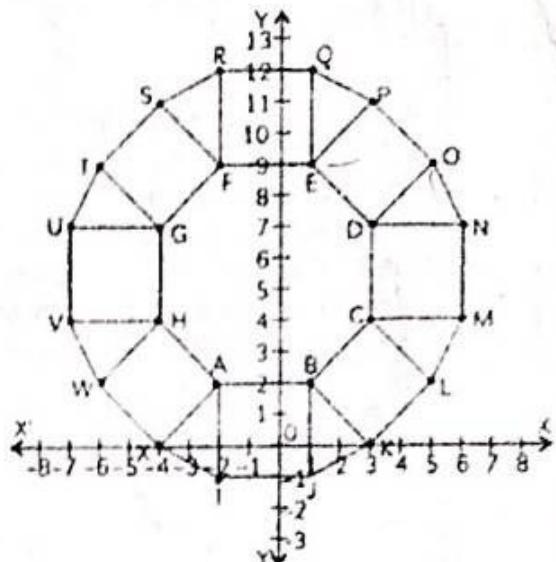
38. Lakshaman Jhula is located 5 kilometres north-east of the city of Rishikesh in the Indian state of Uttarakhand. The bridge connects the villages of Tapovan to Jonk. Tapovan is in Tehri Garhwal district, on the west bank of the river, while Jonk is in Pauri Garhwal district, on the east bank.

Lakshman Jhula is a pedestrian bridge also used by motorbikes. It is a landmark of Rishikesh.

A group of Class X students visited Rishikesh in Uttarakhand on a trip. They observed from a point (P) on a river bridge that the angles of depression of opposite banks of the river are 60° and 30° respectively. The height of the bridge is about 18 metres from the river.
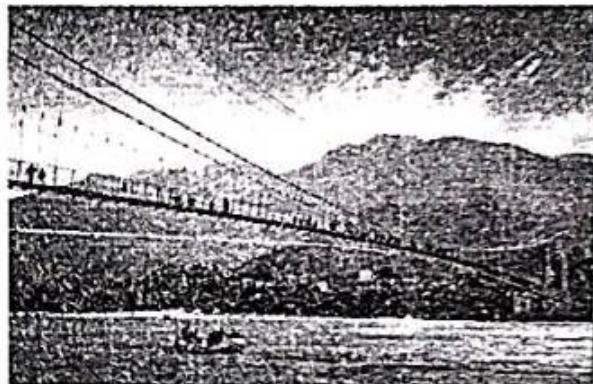
a) Find the distance PA.

b) Find the distance PB.

c) Find the width AB of the river.

OR

Find the height BQ if the angle of the elevation from P to Q be 30°.

(1+1+2)

_____The End_____

P- 8

PRE BOARD-2 (2025-26)
CLASS: X
SUBJECT: MATHEMATICS BASIC

MM:80
                                                    Time:3:00 Hours

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 18 MCQs and 2 Assertion and reasoning Questions carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Q.NO   MARKS

SECTION – A

1. If $a = 2^7 . 3^{10}$ and $b = 2^3 . 3^7$, then $HCF (a, b)$ is :   1
   (a)$2^7 . 3^{10}$ (b) $2^{10} . 3^{17}$ c) $2^3 . 3^7$ (d) $2^7 . 3^7$

2. Which of the following is the polynomial with zeros 3 and -2 ?   1
   (a)$x^2 - x - 6$ (b) $x^2 + x - 6$
   (c) $2x^2 - x - 12$ (d) $x^2 + x + 6$

3. A system of linear equations is given by $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are :   1
   (a)Intersecting
   (b)parallel
   (c) coincident
   (d)either intersecting or parallel

4. The discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$ is   1
   (a)100   (b) 64   (c) 36   (d) 8

5   The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is   1

   (a) 4   (b) -4 (c) 0   (d) 4 and -4

6   In an A.P., if $a = 8$ and $a_{10} = -19$, then value of d is :   1

   (a) -3 (b) $-\frac{11}{9}$ (c) $-\frac{27}{10}$ (d) 3

   $a + (n-1) \times d$

7   In the given figure, $DE \parallel BC$. If $\frac{AD}{DB} = \frac{3}{2}$ and $AE = 2.7cm$ 1
   then EC is equal to :

   $10 = 8 + (n-1) \times d$

   $2 = (10-1) \times d$

   $= 10d - d$

   $2 = d$
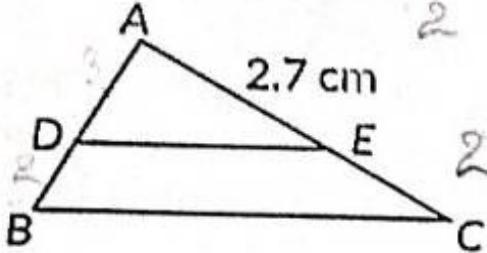
   (a) 2.0 cm   (b) 1.8 b   (c) 5.4 cm   (d) 2.7 cm

8   A line which intersect a circle in two distinct points, is called a   1

   (a) Tangent   (b) chord   (c) secant   (d) diameter

9   Which of the following is not the criterion for similarity of two triangles?   1

   (a) SAS   (b) RHS   (c) AAA   (d) SSS

10   The coordinates of the mid-point of a line segment joining the points $A (3, -1)$ and $B (7, 5)$ are $(5a, 2b)$. The value of $(a + b)$. is :   1

   (a) 7   (b) 3   (c) 5   (d) 2

11   In a right angled triangle ABC, $\angle A = 90°$ and $AB = AC$. The value of $\sin C$ is :   1

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

12   The area swept by 7 cm long minute hand of a clock in 10 minutes is: 1

   (a) $\frac{77}{3} cm^2$ (b) $\frac{77}{6}$ (c) $\frac{77}{2} cm^2$ (d) $77 cm^2$

13   If the volume of a sphere of radius R is equal to 16 times the volume of a hemisphere of radius r, then $R : r$ is :   1

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

14 The value of x for which class mark of the class interval 30
    − x is 36, is :   1

(a)38

(b) 40

(c) 42   (d) 44

15 Two dice are rolled together. The probability of getting a
    doublet is :   1

(a) $\frac{1}{36}$

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

(c) $\frac{1}{18}$ (d) $\frac{5}{36}$

16 The mean and median of a statistical data are 21 and 23
    respectively. The mode of the data is :   1

(a)27   (b) 22

(c) 23   (d) 21

17 A card is drawn from a well shuffled deck of 52 cards. The
    probability that the drawn card is a red queen, is :   1

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

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

(c) $\frac{2}{13}$ (d) $\frac{1}{26}$

18 $\frac{1-tan^2 30°}{1+tan^2 30°}$ is equal to   1

(a) $\sin 60°$ (b) $\cos 60°$ (c) $\tan 60°$ (d) 1

19 **Assertion:** The distance of the point $(-3, 5)$ from the x-
    axis is 3 units.   1
    Reason (R) : Abscissa of a point gives the distance of the
    point from y − axis.

    (a)Both Assertion and Reason are true and
       Reason is the correct explanation of
       Assertion.
    (b)Both Assertion and Reason are true but
       Reason is not the correct explanation of
       Assertion.
    (c)Assertion is true but Reason is false.
    (d)Assertion is false but Reason is true.

20 **Assertion :** The surface area of the largest sphere that
    can be inscribed in a hollow cube of side a cm is πa^2 cm². 1
    Reason: The surface area of a sphere of radius r is $\frac{4}{3}\pi r^3$.

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

(b)Both Assertion and Reason are true but
   Reason is not the correct explanation of
   Assertion.
(c)Assertion is true but Reason is false.
(d)Assertion is false but Reason is true.

Section – B

21. On a morning walk, three persons steps off together and   2
their steps measure 40 cm, 42 cm and 45 cm respectively.
What is the minimum distance each should walk so that
each can cover same distance in complete steps?

22. In figure, if $PQ \parallel BC$ and $PR \parallel CD$, prove that $\frac{QB}{AQ} = \frac{DR}{AR}$.   2
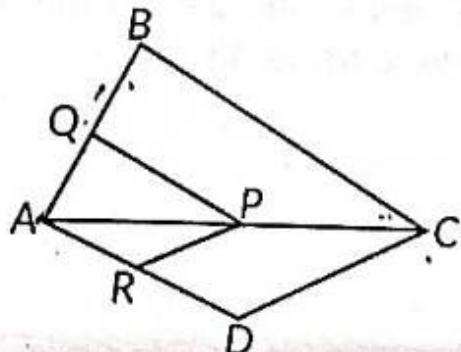
OR

In the given figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} =$
$\frac{BE}{EC}$.
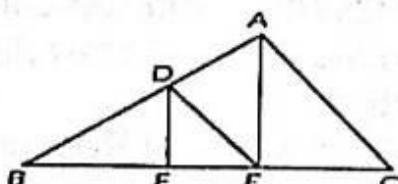
23. If $\tan A = \sqrt{3}$, then find the value of $\cos^2 A - \sin^2 A$.   2

OR

If $x . \sin 60° + \cos 30° - \tan 45° = \frac{\sqrt{3}}{2}$, find the value of $\dot{x}$.

24. In Fig. XAY is a tangent to the circle centred at O. If $\angle ABO$ 2
$= 40°$, then find $\angle BAY$ and $\angle AOB$.

$$\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - 1 \qquad \frac{x\sqrt{3} + \sqrt{3} - 2}{2} = \frac{\sqrt{3}}{2}$$

2,4, 3,5
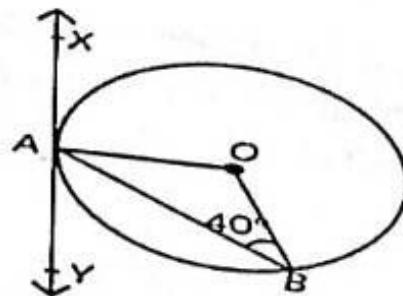
25 The numbers on a die are replaced by the first six even numbers. The die rolled once. Find the probability that the number appearing on the die is :   2
(a)Greater than 4.
(b) Divisible by 3.

Section – C

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

27 Find the zeros of the polynomial $5x^2 + 3x - 2$ and verify the relationship between the zeros and the coefficients of the polynomial.   3

28 A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the reduced speed of the train. Also find the original speed.   3

OR

The altitude of a right angled triangle is 7 cm less than its base. If the hypotenuse is 17 cm long, then represent the above information in the form of a quadratic equation. Also find the length of the sides of the triangle.

29 Prove that

$$\frac{\cot A - \cos A}{\cot A + \cos A} = (\sec A - \tan A)^2$$ 3

30 Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$ 3
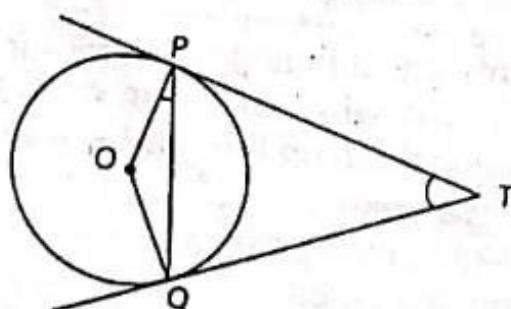
31   In the given figure, three sectors of a circle of radius 7 cm,   3
      making angles of 60°, 80° and 40° at the centre are
      shaded. Find the area of the shaded region.

OR
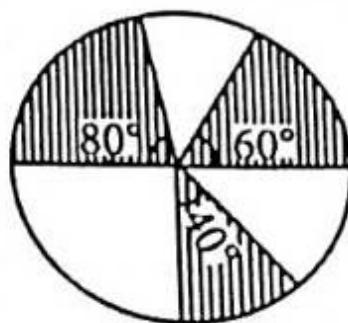
○ A chord of a circle of radius 14 cm subtends an angle of
  90° at the centre. Find the area of the corresponding
  minor and major segments of the circle.

Section – D

32   16 years ago, at the time of marriage, Ram was 5 years   5
      elder to his wife. The present ages of the wife and Ram
      are in the ratio 8 : 9. Find their ages at the time of their
      marriage.

OR

The sum of the digits of a two digit number is 9. Also, nine
times this number is twice the number obtained by
reversing the order of the digits. Find the number.

33   State and prove Basic Proportionality Theorem.   5
      Also, in the given figure, find x in terms of a, b, and c.

$$PQR = \frac{PS}{SR} = \frac{...}{...}$$
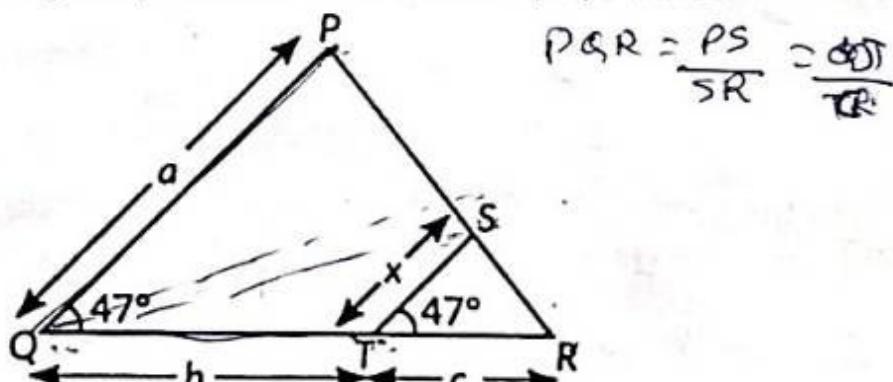
34   Two poles of equal heights are standing opposite each   5
      other on either sides of a road, which is 100 m wide. From
      a point somewhere between them on the road, the angles
      of elevation of the top of the poles are 60° and 30°
      respectively. Find the height of the poles and the
      distances of the point from the poles.

OR

The angles of depression of the top and bottom of a 8 m tall building from the top of a tower are 30° and 45° respectively. Find the height of the tower and the distance between the tower and the building.

35 Find the mode of the following data:

Class	1 – 3	3 – 5	5 – 7	7 – 9	9 – 11
Frequency	7	8	2	2	1

Also, if mean of the data is 4.2, then find the median using empirical relationship.

5

Section – E

36 Rohan's father displays shoes in his shop for sale on the occasion of Diwali. He puts 3 pairs of shoes in 1st row, 5 pairs in the 2nd row, 7 pairs in the 3rd row and so on.

4

Based on the above information, answer the following questions:

(i) How many pairs of shoes are displayed in the 6th row?

(ii) What is the difference of pairs of shoes in the 2nd row and the 6th row?

(iii) Find the total number of pairs of shoes displayed in the first 15 rows?

OR

If the pair of shoes displayed in 4th row are on sale at price of Rs 500 for each pair, then find the total amount earned by him if all shoes in 4th row are sold out.

37   Now a days, drones are used in the fields for agriculture   4
for various tasks like monitoring, spraying of pesticides
etc. A drone is flying over a rectangular field with vertices
$A(-100, 0)$, $B(100, 0)$, $C(100, 150)$ and $D(-100, 150)$.
The drone captures an image at a location (x, y).

Based on the above information, answer the following
questions:
(I) Find the dimensions of the rectangular field.
(II) Find the distance between points A and C.
(III) If the drone captures image of the point P (x, y), find
the relation between x and y such that PA = PC.

OR

If the drone captures the image of an object at a point Q
whose x coordinate is 0 and it is equidistant from points A
and D, find the coordinates of Q.

4

38   A toy rocket is in the form of a right
circular cylinder closed at lower end
and surmounted by the cone with
same radius as that of the cylinder.
The height and diameter of the
cylindrical part is 12cm and 6 cm
respectively. Given slant height of the
conical part is 5 cm.
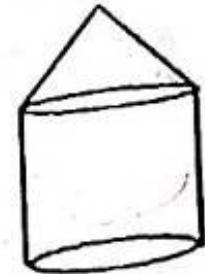
Based on the above information, answer the following
questions:
(I) Find the height of the conical part. 4cm
(II) Find the curved surface area of the cylindrical part. $2\pi rh$
(III) Determine the total surface area of the toy.

OR

Determine the volume of the toy.

General Instructions:
Read the following instructions carefully and follow them:
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 36-38 are case study-based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, internal choices are provided.

(Section A)
Section A consists of 20 questions of 1 mark each.

1.	If n is any natural number, then $6^n - 5^n$ always ends with a) 1 b) 3 c) 5 d) 7	1
2.	If $1 + 2 + 3 + 4 + \cdots + 50 = 25k$, then k = (a) 50 (b) 51 (c) 49 (d) 26	1
3.	The system of equations $y + a = 0$ and $2x = b$ has (a) No solution (b) $\left(-a, \frac{b}{2}\right)$ (c) $\left(\frac{b}{2}, -a\right)$ (d) Infinite solutions	1
4.	OACB is a quadrant of a circle with centre O and radius 7 cm . The area of the shaded region is (a) 23.5 cm² (b) 24.5 cm² (c) 25.5 cm² (d) 26.5 cm²	1
5.	The distance between the points $(4\cos\theta + 3\sin\theta, 0)$ and $(0, 4\sin\theta - 3\cos\theta)$ is (a) 25 (b) 7 (c) 5 (d) $\sqrt{7}$	1
6.	The roots of the equation $x^2 - 3x - m(m + 3) = 0$, where m is a constant, are: (a) m, m + 3 (b) −m, m + 3 (c) m, −(m + 3) (d) −m, −(m + 3)	1
7.	If a regular hexagon is inscribed in a circle of radius 3 cm, then its perimeter is (a) 9 cm (b) 18 cm (c) 27 cm (d) 36 cm	1
8.	A pair of dice is tossed. The probability of not getting the sum eight is (a) $\frac{8}{36}$ (b) $\frac{31}{36}$ (c) $\frac{5}{9}$ (d) $\frac{5}{18}$	1
9.	If $x = 2\sin 60°\cos 60°$ and $y = \sin^2 30° - \cos^2 30°$ and $x^2 = ky^2$, the value of k is (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) 3 (d) −3	1

If $x \tan 45°\sin 30° = \cos 30°\tan 30°$, then x is equal to:

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

11. If the area of the base of a right circular cone is 51cm^2 and it's volume is 85cm^2, then the height of the cone is given as

(a) 5   (b) 4   (c) 3   (d) 7

12. The coordinates of one end point of a diameter of a circle are $(4, -1)$ and the coordinates of the centre of the circle are $(1, -3)$. Find the coordinates of the other end of the diameter.

(a) $(-2, -5)$ (b) $(2, -5)$ (c) $(-2, 5)$ (d) $(2, 5)$

13. If α, β are the zeros of the polynomial $f(x) = x^2 - p(x + 1) - c$ then $(\alpha + 1)(\beta + 1) =$

a) $c - 1$ b) $1 - c$ c) c d) $1 + c$

14. If $\triangle ABC \sim \triangle PQR$, then perimeter of the triangle PQR (in cm) is

(a) 12   (b) 24
(c) 18   (d) 20
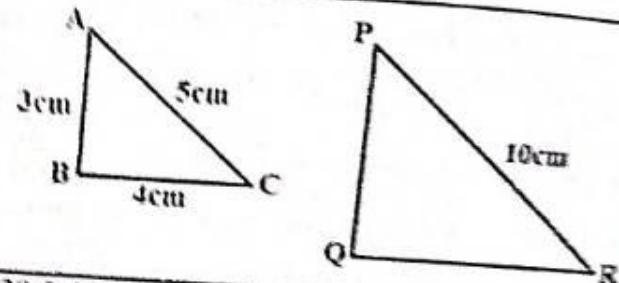
15. The median of a set of 15 distinct observations is 30.5. If each of the largest 7 observations of the set is increased by 3, then the median of the new set

(a) is increased by 3.   (b) is decreased by 3.
(c) is three times the original median.   (d) remains the same as that of the original set.

16. A quadrilateral ABCD is drawn to circumscribe a circle. If BC=7cm, CD=4cm and AD=3cm, then the length of AB is

(a) 3cm   (b) 4cm   (c) 6cm   (d) 7cm

17. What is the positive root of $\sqrt{3x^2 + 6} = 9$

(a) ± 3 (b) ± 5 (c) 0   (d) ± 6

18. In given figure, if PQR is the tangent to a circle at Q, AB is a chord parallel to PR and $\angle BQR = 70°$ then $\angle AQB$ is equal to

(a) 20°   (b) 40°   (c) 35°   (d) 45
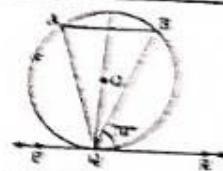
19. Assertion (A): If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre of the circle.
Reason (R): A parallelogram circumscribing a circle is a rhombus.

20. Assertion (A): If a vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow of 28 m long, then the height of the tower is 42 m.
Reason (R): If in two triangles, their corresponding angles are equal, then the triangles are similar.

(Section – B)
Section B consists of 5 questions of 2 marks each.

21. The A.P 8, 10, 12........ has 60 terms. Find the sum of last 10 terms.
OR
Find the middle term of A.P 6, 13, 20, ... 230

22.	For what values of m and n does the following pair of linear equations have infinitely many solutions? $$2x + 3y = 7; \qquad m(x + 2y) + n(x - y) = 21$$ OR Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeros equal to half of their product.	2
23.	In $\triangle ABC$, D and E are the points on the side AB and AC respectively such that $DE \parallel BC$. If $AD = 6x - 7$, $DB = 4x - 3$, $AE = 3x - 3$ and $EC = 2x - 1$, then find the value of x.	2
24.	Prove that $\quad \sqrt{\sec^2\theta + \csc^2\theta} = \tan\theta + \cot\theta$	2
25.	A horse, a cow and a goat are tied, each by ropes of length 14m, at the corners A, B and C of $\triangle$ ABC respectively. Find the area of grass field that can be grazed by them.	2

(Section – C)
Section C consists of 6 questions of 3 marks each.

26.	In Figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90°$	3

27.	Solve: $\dfrac{1}{(x - 2)} + \dfrac{2}{(x - 1)} = \dfrac{6}{x}$ OR In a cyclic quadrilateral ABCD, $$\angle A = (2x - 1)°, \angle B = (y + 5)°, \angle C = (2y + 15)°, \angle D = (4x - 7)°.$$ Find the four angles.	3
28.	A chord of a circle of the radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$).	3
29.	Solve using identities $\qquad \dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \csc A + \cot A$	3
30.	Three numbers are in A.P. If the sum of these numbers is 27 and the product 648, find the numbers. OR Find out the sum of the integers between 100 and 200 that are "not divisible by 9".	3
31.	In the given figure, PA, QB and RC are perpendicular to AC. If PA = x units, QB = y units and RC = z units, prove that $$\dfrac{1}{x} + \dfrac{1}{z} = \dfrac{1}{y}.$$	3
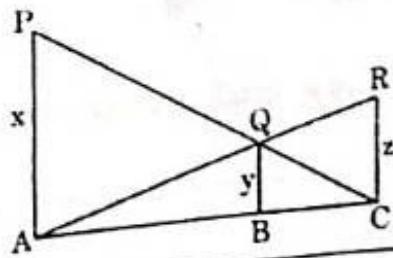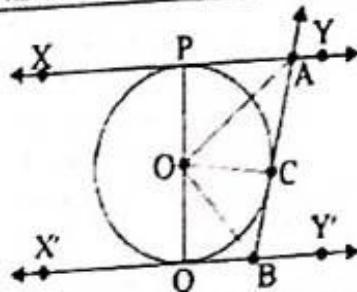
(Section – D)
Section D consists of 4 questions of 5 marks each

32. A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is the original average speed?

OR

(a) The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of other two sides of the triangle.

(b) Aftab explains to his daughter, "Seven years ago, I was seven times as old as you were then. Moreover, three years from now, I shall be three times as old as you will be." Find their ages

33. A factory has three machines producing well counts of items: 168, 210, and 280 pieces per hour. The manager wants to find the largest batch size that divides all production counts evenly and also find how many such batches per hour.

(a) What is the largest batch size that divides 168, 210, 280 evenly?

(b) How many batches per hour for each machine?

(c) Also find the least number of hours after which all three machines produce a common multiple of batch size .

34. A room is in the form of a cylinder surmounted by a hemispherical dome.

The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains $\frac{1408}{21}$ m^3 of air, find the height of the cylindrical part. (Use $\pi = \frac{22}{7}$).

Also find the Curved surface area of the room.

OR

An empty cone of radius 3cm and height 12cm is filled with ice-cream such that the lower part of the cone which is $\frac{1}{6}$ th volume of the cone is unfilled (empty) but a hemisphere is formed on the top. Find the volume of the ice-cream.

35. If the mode of the following distribution is 55, then find the value of x. Hence, find the median.

Class Interval	0 - 15	15 - 30	30 - 45	45 - 60	60 - 75	75 - 90
Frequency	10	7	x	15	10	12

OR

Marks of students is given below. Find median and mode.

Marks	No. of students
0 and above	40
10 and above	28
20 and above	16
30 and above	10
40 and above	8
50 and above	0

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

36. The position of three friends Aman, Kirti and Chahat are shown by the points P, Q and R.

  i. Find the distance between P and R.
  ii. Is Q, the midpoint of PR? Justify by finding midpoint of PR.
  iii. Find the point on x-axis which is equidistant from P and Q.

  OR

  Let S be a point which divides the line joining PR in ratio 2:3. Find the coordinates of S.
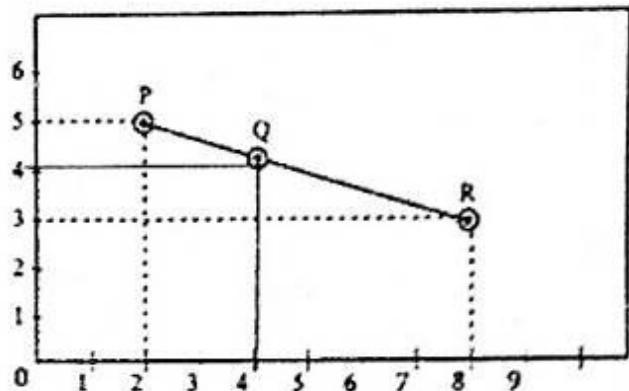
37. From a point P on the ground, Angle of elevation to the top of a 10 m building is 30°. A flagstaff is hoisted at the top of the building.
Angle of elevation to the top of the flagstaff = 45°
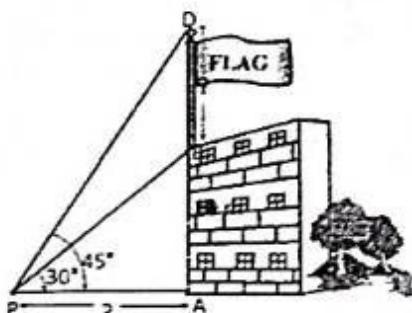
Find:
  i.
  ii. (i) Distance of the building from point P?
  ii. (ii) Length of the flagstaff?

(iii) If the angle of elevation to the top of the flagstaff becomes 60° (distance still $10\sqrt{3}$), what is the new flagstaff height?

OR

If the point P is moved so that the angle of elevation to the top of the building becomes 60°, find the new distance from P.

38. One of four main blood types can be found in a human body. They are known as A, B, AB and O. Each blood type can be further classified as either a Rhesus positive (+) or Rhesus negative (−).

For example, a possible combination is blood type O and Rhesus negative which is written as O⁻

The data below shows the distribution of the blood types and Rhesus types of given blood type for a Blood Donation Center recorded (in percentages) for the year 2023.

BLOOD GROUP	RHESUS FACTOR	NUMBER OF PERSONS (in %)
O	O^-	x
	O^+	30
A	A^-	8
	A^+	24
B	B^-	6
	B^+	18
AB	AB^-	1
	AB^+	3

i. Find the value of x.
ii. Find the probability that a randomly selected person has a Rhesus negative blood type.
iii. What is the probability that the person selected from the record is Rhesus positive but neither blood type A nor B?

OR

People with blood type AB positive (AB^+) are known as the universal recipient and with blood type O negative (O^-) are known as universal donor. Find the probability of a selected person to be neither universal recipient nor universal donor

THE END

PRE-BOARD EXAMINATION (2025-26)
CLASS : X
SUBJECT: MATHEMATICS (STANDARD) (041)

Time Allowed : 3 hours **Maximum Marks : 80**

समय : 3 घंटे **अधिकतम अंक : 80**

सामान्य निर्देश-

1. इस प्रश्न पत्र में कुल 38 प्रश्न हैं जिनको 5 खंडों-अ, ब, स, द और ई में विभाजित किया गया है। सभी प्रश्न अनिवार्य हैं।

2. खंड-अ में प्रश्न संख्या 1 से 18 तक बहुविकल्पीय प्रश्न हैं तथा प्रश्न संख्या 19 एवं 20 अभिकथन-कारण आधारित प्रश्न हैं। प्रत्येक प्रश्न 1 अंक का है।

3. खंड-ब में अति लघु उत्तरीय प्रकार के 5 प्रश्न हैं। प्रत्येक प्रश्न 2 अंक का है।

4. खंड-स में लघु उत्तरीय प्रकार के 6 प्रश्न हैं। प्रत्येक प्रश्न 3 अंक का है।

5. खंड-द में दीर्घ उत्तरीय प्रकार के 4 प्रश्न हैं। प्रत्येक प्रश्न 5 अंक का है।

6. खंड-ई में 3 केस स्टडी आधारित प्रश्न हैं जो 1,1 एवं 2 अंक के उपभागों में विभाजित हैं। प्रत्येक प्रश्न 4 अंक का है।

7. प्रश्नपत्र में कोई समग्र विकल्प नहीं हैं। यद्यपि खंड-ब, स और द के 2-2 प्रश्नों में तथा खंड-ई के 2 अंकों के प्रश्नों में आंतरिक विकल्प दिए गए हैं। आपको दिए गए विकल्पों में से किसी एक विकल्प को हल करना है।

8. जहाँ आवश्यक हो, साफ-सुथरी आकृति बनाएँ।

9. जब तक अन्यथा न कहा जाए, $\pi = \frac{22}{7}$ का प्रयोग करें।

10. ऋणात्मक मूल्याँकन का प्रावधान नहीं है।

11. कैलकुलेटर के प्रयोग की अनुमति नहीं है।

प्रत्येक प्रश्न का उत्तर आरंभ करने से पहले प्रश्न का क्रमांक अवश्य लिखें

GENERAL INSTRUCTIONS:

1. This question paper contains 38 questions divided into five parts A, B, C, D and E. All the questions are compulsory.

2. In section A Question no. 1-18 are multiple choice questions and Question no. 19 and 20 are Assertion-Reason based questions. Each question is of 1 mark.

3. Section B consists of 5 very short answer type questions. Each question is of 2 marks.

4. Section C consists of 6 short answer type questions. Each question is of 3 marks.

5. Section D consists of 4 long answer type questions. Each question is of 5 marks.

6. Section E consists of 3 case-study based questions having sub-parts of 1,1 and 2 marks. Each question is of 4 marks.

7. There is no overall choice. However internal choices are provided in 2-2 questions of Section B, C and D and in 2 marks questions of Section E. You have to attempt only one of the alternatives in all such questions.

8. Draw neat and clean figures, wherever required.

9. Use $\pi = \frac{22}{7}$ unless stated.

10. There is no negative marking.

11. Use of calculator is not permitted

Please write down the serial number of question before attempting it.

SECTION-A

Q. 1-20 are multiple choice questions. Select the appropriate answer from given options. Each question is of 1 mark.

1. There are 329, 282, 188 students in class VI, VII and VIII respectively. Buses to be hired to take these students to picnic. The maximum number of students who can be seated equally in the bus is :

(a) 47

(b) 49

(c) 43

(d) 41

2. In $\triangle ABC$ and $\triangle PQR$ we have $\dfrac{AB}{QR} = \dfrac{BC}{PR} = \dfrac{CA}{PQ}$ then :   1

(a) $\triangle PQR \sim \triangle CAB$

(b) $\triangle PQR \sim \triangle ABC$

(c) $\triangle CBA \sim \triangle PQR$

(d) $\triangle ABC \sim \triangle PQR$

3. A circle of radius 5 units has centre (-2, 2). The point (-6, y) lies on circumference of circle. The value of y will be :   1

(a) -3

(b) 1

(c) 5

(d) 6

4. The quadratic polynomial whose zeroes are -3 and 4 is :   1

(a) $x^2 - x + 12$

(b) $x^2 + x + 12$

(c) $2x^2 + 2x - 24$

(d) $\dfrac{x^2}{2} - \dfrac{x}{2} - 6$

5. If the probability of choosing a vowel at random from the letter of words "MATHEMATICS" is $\dfrac{3}{3x+1}$, then x equals :   1

(a) $\dfrac{27}{12}$

(b) $\dfrac{12}{27}$

(c) $\dfrac{12}{29}$

(d) $\dfrac{29}{12}$

6. If $x \tan 60° \cos 60° = \sin 60° \cot 60°$, then x equals : 1

   (a) $\cos 30°$

   (b) $\tan 30°$

   (c) $\sin 30°$

   (d) $\cot 30°$

7. The radius of a circle is same as the side of a square. Their perimeter will be in ratio: 1

   (a) $1 : 1$

   (b) $2 : \pi$

   (c) $\pi : 2$

   (d) $\sqrt{\pi} : 2$

8. A rectangular sheet of paper 40×22 is rolled to form a hollow cylinder of height 40 cm. The radius of hollow cylinder is : 1

   (a)   3.5 cm

   (b)   7 cm

   (c) $\dfrac{80}{7}$ cm

   (d)   5 cm

9. The diameter of a wheel is 1.26 m. The distance travelled by wheel in 500 revolutions is :1

   (a)   2670 m

   (b)   2880 m

   (c)   1980 m

   (d)   1596 m

10. If the circumference of base of two right circular cylinders are in ratio 3:5. and their volume are in ratio 9:45, then the ratio of their height will be: 1

   (a)   9:5

   (b)   5:9

   (c)   9:25

   (d)   1:15

11. From the top of a building the angle of depression of two bikes on the opposite sides of the building are observed to be 45° and 60°. If the height of the building is 'h' meter, then distance between two bikes is : 1

   (a) $h\left(\dfrac{1+\sqrt{3}}{3}\right)$ m

   (b) $h\left(\dfrac{3+\sqrt{3}}{\sqrt{3}}\right)$ m

   (c) $h\left(\dfrac{3+\sqrt{3}}{3}\right)$ m

   (d) $\dfrac{h}{\sqrt{3}}$ m

12. The point A (9, 0), B (9, 6), C (-9, 0) and D (-9, 6) are vertices of a :   1

    (a)   square

    (b)   rectangle

    (c)   parallelogram

    (d)   trapezium

13. In $\triangle ABC$, $PQ \parallel BC$, $AB = 6$ cm, $AP = 1.5$ cm. If $BC = 8$ cm, then PQ is :   1

    (a)   2 cm

    (b)   4 cm

    (c)   6 cm

    (d)   8 cm

14. The sum of all three digit numbers divisible by 13 is :   1

    (a) $\dfrac{68}{2}(104+998)$

    (b) $\dfrac{69}{2}(104+988)$

    (c) $\dfrac{66}{2}(114+998)$

    (d) $\dfrac{68}{2}(102+988)$

15. One root of quadratic equation $4x^2 - 10x + (K - 4) = 0$ is reciprocal of the other. Then 'K' will be: 1

    (a)   8

    (b)   -8

    (c)   6

    (d)   1

16. In 2010 Hema started a business with an initial investment of ₹ 20,000 and earned a profit of ₹ 5,000 every year. Her investment reaches ₹ 60,000 in the year :   1

    (a)   2018

    (b)   2026

    (c)   2019

    (d)   2024

17. The diameter of a semicircular protractor is 14 cm. Its circumference will be :   1

    (a)   7 cm

    (b)   14 cm

    (c)   21 cm

    (d)   36 cm

18. $\triangle ABC$ is right angled at B and $AB : AC = 1:2$. The value of $\dfrac{2\tan A}{1+\tan^2 A}$ is :   1

(a) $\dfrac{1}{2}$ (b) $\dfrac{5}{2}$

(c) $\dfrac{\sqrt{3}}{2}$ (d) $\dfrac{2}{\sqrt{3}}$

Directions : In Q.No 19 and 20, a statement of Assertion (A) is followed by Reason (R). Choose the correct option :

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

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

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

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

19. Assertion (A) : PA and PB are two tangents to a circle with centre O such that $\angle AOB = 100°$, then $\angle APB = 70°$.   1

Reason (R) : The length of two tangents drawn from external points are equal.

20. Assertion (A): Trigonometric ratios are independent of the size of triangle but depend only on the angle.   1

Reason (R) : Trigonometric ratios are derived from similar triangles which have equal angles but proportional sides.

SECTION-B

This section has 5 very short answer (VSA) type questions carrying 2 marks each.

21. Two alarm clocks ring at regular intervals of 85 and 119 seconds respectively. If they first beep together at 12 noon, at what time will they beep again together?   2

OR

Show that $13 \times 19 \times 23 + 3 \times 13$ is NOT a prime number.

22. Two tangents PA & PB inclined at an angle of $60°$ are drawn to a circle having centre O. Find $\angle POA$.   2

23. The vertices of a $\triangle ABC$ are A(2, 3), B(6, 7) and C(10, 3). Find the distance between mid-points of AB and AC.   2

OR

A(5,1), B(1,5) and C(-3,-1) are vertices of $\triangle ABC$. Find the length of median AD.

24. The volume of a right circular cylinder having height equal to its radius is $84\frac{6}{7} cm^3$. Find the height of cylinder.   2

25. The probability of selecting a violet ball at random from a jar containing violet, saffron and pink ball is $\frac{1}{4}$. The probability of selecting a saffron ball at random is $\frac{1}{3}$. If jar contains 10 pink balls, then find the total number of balls in jar.   2

SECTION-C

This section has 6 short answer (SA) type questions carrying 3 marks each.

26. Show that there is no positive integer 'm' for which $\sqrt{m+1} + \sqrt{m-1}$ is rational.   3

OR

Prove that $\sqrt{n}$ is **NOT** a rational number if n is **NOT** a perfect square.

27. If the zeroes of the polynomial $x^2 + px + q$ are four times the zeroes of $2x^2 - 5x - 3$, then find the value of p and q.   3

28. In figure there are two concentric circles with centre O. PRT and PQS are tangents to inner circle from a point P lying on the outer circle. If PR = 10 cm, find PS.   3

$2x^2 - 5x - 3 =$
5

$\frac{6}{3}$
13
1
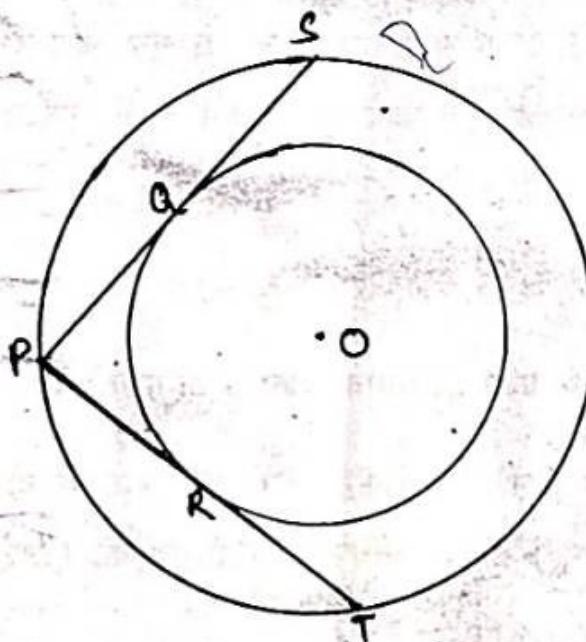
For visually impaired students only:

Prove that line joining the points of contact of two parallel tangents to a circle is the diameter of the circle.

29. A new highway linking cities A(2, 3) and B (8, 10) is to be designed by Kartikey, a civil engineer. It is necessary to divide the roadway into three sections to facilitate the easy passage of heavy vehicles, four wheelers and two wheelers. Determine the co-ordinates of two points where highway should be trisected. 3

30. A window in the building is at height of 20 m from the ground. The angle of depression of point P on the ground from the window is 30°. If the angle of elevation of the top of the building from the same point P is 60°, find the height of the building. 3

OR

From the top of 120 m high tower, the angle of depression of top and bottom of a pole are observed to be 45° and 60°. Find the height of the pole. (Take $\sqrt{3}=1.73$)

31. A number x is selected at random from the numbers 1, 4, 9, 16, 25 and another number y is selected at random from the numbers 1, 2, 3, 4, 5. Find the probability that the product of x and y is less than 25. 3

SECTION-D

Question 32-35 are long answer type questions. Each question is of 5 marks.

32. The hypotenuse of right angled triangle is 1 m less than twice the shortest side. If the third side is 1 m more than the shortest side, find the sides of the triangle. Also, find its area. 5

OR

For what value of K the equations $2x^2 + Kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ may have one common root?

33. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides at distinct points then the other two sides are divided in the same ratio. Using the above theorem prove that the line through the point of intersection of diagonals and parallel to the base of trapezium divides the non-parallel sides in the same ratio. 5

OR

ABCD is a parallelogram. AB is divided at P and CD at Q so that $AP:PB = 3:2$ and $CQ:QD = 4:1$. If PQ meets AC at R, then prove that $AR = \frac{3}{7} AC$.

34. Prove that : 5

$$\frac{cosecA - cotA}{cosecA + cotA} + \frac{cosecA + cotA}{cosecA - cotA} = 2\left(\frac{1 + cos^2 A}{1 - cos^2 A}\right)$$

Also, prove the same for $A = 45°$.

35. Find Mean, Median and Mode of following data : 5

Marks	0-20	20-40	40-60	60-80	80-100	100-120	120-140
No.of students	6	8	10	12	6	5	3

Questions 36-38 are case study based questions. Each question is of 4 marks.

36. A local farmer Santosh has some cows and hens on his form. His prize winning cow 'Kamdhenu' recently gave birth to two calves. Following this Santosh recounted his livestock and made following observations :

   • Ratio of total number of heads to total number of feet among all his animals is now 12:35.

   • Total number of heads is 48.
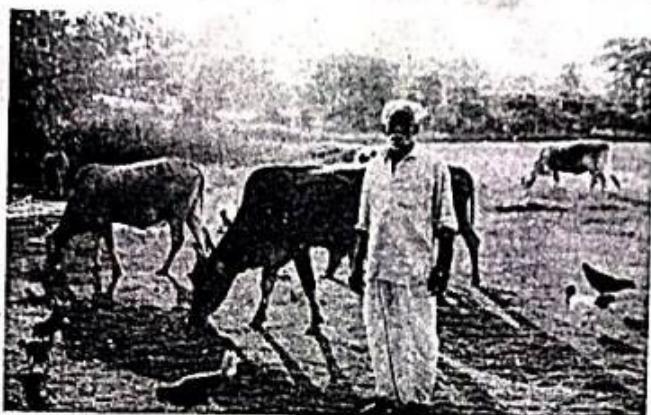
   Based on above information answer following questions :

   (i)   Express the above situation into a system of linear equation.   1

   (ii) Calculate the initial number of cows.   2

<div align="center">OR</div>

   Calculate initial number of hens.

   (iii) Santosh sells all his cows and replaces them with hens to have total 50 hens. Find the number of hens added.   1

37. A company started manufacturing TV sets in the year 2015. The production of TV sets in its factory increases uniformly by a fixed number every year. It produces 16000 sets in 6th year and 22600 sets in 9th year.
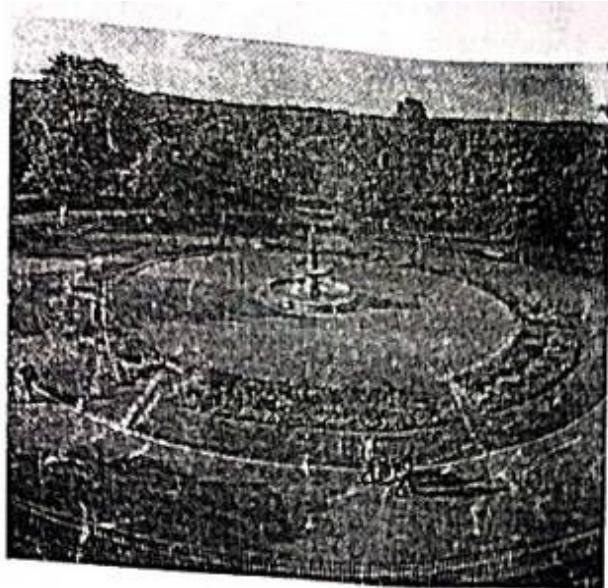
Based on above information answer the following questions :

(i) How much area of the park is covered with the grass?   1

(ii) Find the cost of fencing the park along its boundary.   1

(iii) Find the total cost of levelling the path if it costs ₹ 50 per m².   2

OR

Form an equation representing the total area of park in terms of area of path, grass and fountain. Explain how the different regions together form this total.

P-4

PERIODIC TEST-1
CLASS-X
MATHS

MM-40   TIME-90 MINUTES

SECTION A	QUESTION 1 TO 10 CARRY 1 MARKS EACH	
1	On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps? (A) 2520cm (B) 2525cm (C) 2555cm (D) 2528cm	1
2	For what value of k is; -4 a zero of the polynomial $f(x) = x^2 - x - (2k + 2)$? (a) 6 (b) -6 (c) 9 (d) -9	1
3	**Assertion:** For any two positive integers p and q, HCF (p, q) × LCM (p, q) = p × q **Reason:** If the HCF of two numbers is 5 and their product is 150, then their LCM is 40 (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (B) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (C) Assertion (A) is true but reason (R) is false. (D) Assertion (A) is false but reason (R) is true.	1
4	The zeroes of the polynomial $x^2 - 3x - m(m + 3)$ are: (a) m, m + 3 (b) $-$ m, m + 3 (c) m, $-$ (m + 3) (d) $-$ m, $-$ (m + 3)	1
5	The value of k for which the system of linear equations $x + 2y = 3$; $5x + ky + 7 = 0$ is inconsistent is: (a) 3 (b) -4 (c) 8 (d) 4 (e) 10	1
6	. The value of $\sqrt{6 + \sqrt{6 + \sqrt{6......}}}$	1

	(A) 3.5	(B) 4	(C) 3	(D) – 3	
7	2 The H.C.F. and the L.C.M. of 12, 21, 15 respectively are: (a) 3, 140 (b) 12, 420 (c) 3, 420 (d) 420, 3 Ans. (c) 3, 420				1
8	If k, 2k – 1 and 2k + 1 are three consecutive terms of an A.P., then the value of k is (a) 2 (b) 3 (c) –3 (d) 5				1
9	If the sum of first m terms of an A.P. is m(5m-3), then what is its second term? (a) 9 (b) 10 (c) 11 (d) 12				1 / 14
10	The roots of the equation $2x - \dfrac{3}{x} = 1$ are (a) $\dfrac{1}{2}, -1$ (b) 3 ,2 (c) $-1, \dfrac{3}{2}$ (d) none of these				1
SECTION B	QUESTION 11 TO 14 CARRY 2 MARKS EACH				
11	Obtain the zeroes of $4\sqrt{3}x^2+5x-2\sqrt{3}$ and verify relation between zeroes and coefficient				2
12	Prove that $4\sqrt{2}$ is an irrational number.				2
13	Check whether 15^n can end with the digit 0, where n is any natural number				2
14	Find the value of k such that $3x^2 + 2kx + x - k - 5$ has the sum of zeros as half of their product				2
SECTION-C	QUESTION 15 TO 17 CARRY 3 MARKS EACH				
15	solve for x $\dfrac{1}{x+1} + \dfrac{2}{x+2} = \dfrac{4}{x+4}$ or The pair of linear equation 2x + 3y =11 and (m+n)x + (2m – n y) = 33 has infinitely many solution.Find the value of m and n				3
16	The sum of the first 6 term of an AP is zero and the fourth term is 2.Find the sum of first 30 terms				3
17	Solve algebraically following pair of linear equation for x and y 37x + 43y = 123 43x + 37y = 117				3

SECTION D	QUESTION 18 CARRY 5 MARKS EACH	
18	A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train is 10 km/hr less than that of the fast train, find the speeds of the two train. OR A two digit number is such that the product of its digit is 14. If 45 is added to the number, the digits interchange their places. Find the number.	5
	(CASE BASED QUESTION) QUESTION 19-20 CARRY 4 MARKS EACH	
19	(i) Junk food is unhealthful food that is high in calories from sugar to fat, with little dietry fiber, protein, vitamins, minerals, or other important forms of nutritional value. A sample of few students have taken . If α be the number of students who take junk food, β be the number of students who take healthy food such that $\alpha > \beta$ and α and β are the zeroes of the quadratic polynomial $f(x) = x^2 -7x +10$, then answer the following questions: (1) Name the type of expression of the polynomial in the above statement?	1
	(2) Find the number of students who take junk food.	1
	(3) Find the number of students who take healty food. Or (d) Find the quadratic polynomial whose zeroes are -3 and -4 $x^2 -x -12 = 0$	2

20	**Case study 2**	
	In November 2020, some new animals were added to a zoo. As a result the number of visitors to the zoo, increased daily by 10. A total of 6150 people visited zoo during that month.	

Based on the above information, answer the following question:

(i) How many visitors visited the zoo on 1st November?   **1**

(ii) on which day of the month did 250 visitors visit the zoo?   **1**

(iii) how much collection (in rupees) from sale of tickets was done in the zoo on 15 November, if each entry ticket cost Rs 50?   **2**

OR

If the zoo is closed on 1st December due to some reason, what will be the loss (in rupees) in terms of sale of tickets?

MATHS MCQs CLASS 10

1. In a formula racing competition, the time taken by two racing cars A and B to complete 1 round of the track is 30 minutes and p minutes respectively. If the cars meet again at the starting point for the first time after 90 minutes and the HCF (30, p) = 15, then the value of p is

(a) 45 minutes ✓   (b) 60 minutes   (c) 75 minutes   (d) 180 minutes

2. The solution of the following pair of equation is: $x - 3y = 2, 3x - y = 14$

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

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

(a) xy (b) xy^2 ✓   (c) $x^3 y^3$ (d) $x^2 y^2$

4. The ratio in which x-axis divides the join of (2, -3) and (5, 6) is:

(a) 1: 2 ✓   (b) 3 : 4   (c) 1: 3   (d) 1: 5

5. The 11th and 13th terms of an AP are 35 and 41 respectively, its common difference is

(a) 38   (b) 32   (c) 6   (d) 3 ✓

6. A medicine-capsule is in the shape of a cylinder of radius 0.25 cm with two hemispheres stuck to each of its ends. The length of the entire capsule is 2 cm. What is the total surface area of the capsule? (Take π as 3.14)

(a) 0.785 cm²   (b) 0.98125 cm²   (c) 2.7475 cm²   (d) 3.14 cm² ✓

7. A 1.6 m tall girl stands at distance of 3.2 m from a lamp post and casts shadow of 4.8 m on the ground, then the height of the lamp post is

(a) 8 m   (b) 4 m   (c) 6 m   (d) 8/3 m ✓

8. A tangent is drawn from a point at a distance of 17 cm of circle (O, r) of radius 8 cm. The length of tangent is

(a) 5 cm   (b) 9 cm   (c) 15 cm ✓   (d) 23 cm

9. The runs scored by a batsman in 35 different matches are given below:

Runs Scored	0-15	15-30	30-45	45-60	60-75	75-90
Frequency	5	7	4	8	8	3

The lower limit of the median class is

(a) 15   (b) 30   (c) 45 ✓   (d) 60

10. If in two triangles, DEF and PQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true?

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

11. In the given figure, if AB = 14 cm, then the value of tan B is:

(a) $\frac{4}{3}$ ✓   (b) $\frac{14}{3}$ (c) $\frac{5}{3}$ (d) $\frac{13}{3}$
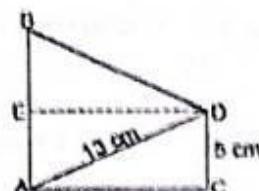
12. Two cubes each with 6 cm edge are joined end to end. The surface area of the resulting cuboid is

(a) 180 cm²   (b) 360 cm²   (c) 300 cm²   (d) 260 cm²

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

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

14. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

(a) 7 (b) 14 (c) 21 (d) 28

15. If $3 \sin \theta - \cos \theta = 0$ and $0° < \theta < 90°$, find the value of θ.

(a) 30° (b) 45° (c) 60° (d) 90°

16. Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots.
(a) 2 (b) 3 (c) 4 (d) 5

17. In the below figure, the pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. Then radius of the circle is

(a) 10 cm (b) 7.5 cm (c) 5 cm ✓ (d) 2.5 cm

18. The radii of two cylinders are in the ratio 5 : 7 and their heights are in the ratio 3 : 5. The ratio of their curved surface area is

(a) 3 : 7 (b) 7 : 3 (c) 5 : 7 (d) 3 : 5

Direction : In the question number 19 & 20 , A statement of Assertion (A) is followed by a statement of Reason(R). Choose the correct option

19. Assertion (A): If $x = 2 \sin^2 \theta$ and $y = 2 \cos^2 \theta + 1$ then the value of $x + y = 3$. Reason (R): For any value of θ, $\sin \theta + \cos^2 \theta = 1$

20. Assertion (A): The length of the minute hand of a clock is 7 cm. Then the area swept by the minute hand in 5 minute is $77/6$ cm^2 .

Reason (R): The length of an arc of a sector of angle q and radius r is given by $\frac{\theta}{360°} 2\pi r$.

21. The point on the x-axis which is equidistant from (– 4, 0) and (10, 0) is:
(a) (7, 0) ✗ (b) (5, 0) (c) (0, 0) (d) (3, 0) ✓

22. If a cylinder is covered by two hemispheres shaped lid of equal shape, then the total curved surface area of the new object will be
(a) $4\pi rh + 2\pi r2$ (b) $4\pi rh - 2\pi r2$ (c) $2\pi rh + 4\pi r2$ (d) $2\pi rh + 4\pi r$

23. If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a =
(a) 1 (b) 2 (c) 3 (d) 4 ✓

24. The sum of exponents of prime factors in the prime-factorisation of 196 is:
(a) 3 (b) 4 (c) 5 (d) 6

25. The values of k for which the quadratic equation $2x2 - kx + k = 0$ has equal roots is
(a) 0 only (b) 8 only (c) 0,8 (d) 4

26. A number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3 the probability that $|x| < 2$ is

(a) 1/7 (b) 2/7 (c) 3/7 (d) 5/7

27. If $x = 2\sin2 \theta$ and $y = 2\cos2 \theta + 1$ then x + y is:
(a) 3 (b) 2 (c) 1 (d) 1/2

28. If 1 2 is a root of the equation $x2 + kx - 5/4 = 0$, then the value of k is
(a) 2 (b) -2 (c) ¼ (d) ½

29. The pair of equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ have
(a) a unique solution (b) exactly two solutions (c) infinitely many solutions (d) no solution ✓

30. The point which lies on the perpendicular bisector of the line segment joining point A (–2, –5) and B (2, 5) is:
(a) (0, 0) ° (b) (0, –1) (c) (–1, 0) (d) (1, 0)

MATHS MCQs CLASS 10

1	If PA and PB are tangents to the circle with centre O such that $\angle APB = 40°$, then $\angle OAB$ is equal to (a) 40° (b) 30° (c) 20° (d) 25°
2	If the coordinates of one end of a diameter of a circle are (2, 3) and the coordinates of its centre are (-2, 5), then the coordinates of the other end of the diameter are (a) (0, 8) (b) (0, 4) (c) (6, -7) (d)(-6, 7)
3	AOBC is a rectangle whose three vertices are vertices A (0, 3), O (0, 0) and B (5, 0). The length of its diagonal is (a) 5 (b) 3 (c) $\sqrt{34}$ (d) 4
4	A bag has 5 white marbles, 8 red marbles and 4 purple marbles. If we take a marble randomly, thenwhat is the probability of not getting purple marble? (a) 0.5 (b) 0.66 (c) 0.08 (d) 0.77
5	In what ratio does the x-axis divide the join of A(2, -3) and B(5, 6)? (a) 1 : 2 (b) 3 : 5 (c) 2 : 1 (d) 2 : 3
6	If the lines $3x + 2ky - 2 = 0$ and $2x + 5y + 1 = 0$ are parallel, then what is the value of k? (a) 4/15 (b) 15/4 (c) 4/5 (d) 5/4
7	The distance between the points (3, -2) and (-3, 2) is: (a) 40 (b) $4\sqrt{10}$ (c) $2\sqrt{10}$ (d) $\sqrt{52}$
8	The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is: (a) 10 (b) 100 (c) 504 (d) 2520
9	The relation between mean, mode and median is (a) mode = (3 x mean) - (2 x median) (b) mode = (3 x median) - (2 x mean) (c) mean = (3 x median) - (2 x mode) (d) median = (3 x mean) - (2 x mode)
10	A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled withwater. If the sphere is completely submerged then the water level rises by (b) 4cm (b) 5 cm (c) 3 cm (d) 6 cm
11	One card is drawn at random from a well-shuffled deck of 52 cards. What is the probability ofgetting a black face card? (a) 3/13 (b) 3/14 (c) 3/26 (d) 1/26
12	The roots of quadratic equation $2x^2 + x + 4 = 0$ are: (c) Positive and negative (b) Both Positive (c) Both Negative (d) No real roots
13	If P(A) denotes the probability of an event A, then (a) P(A) < 0 (b) P(A) > 1 (c) $0 \le P(A) \le 1$ (d) $-1 \le P(A) \le 1$
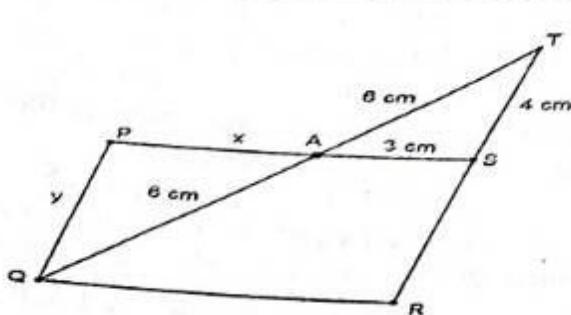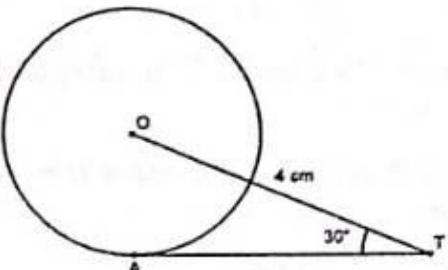
14	In $\triangle$ ABC, right-angled at B, AC = 25 cm, BC = 7 cm. The value of tan C is:
	(a) 12/7 (b) 24/7 (c) 20/7 (d) 7/24
15	HCF of $(2^3 \times 3^2 \times 5)$, $(2^2 \times 3^3 \times 5^2)$ and $(2^4 \times 3 \times 5^3 \times 7)$ is
	(a) 60 (b) 48 (c) 30 (d) 105
16	If one equation of a pair of dependent linear equations is -3x+5y-2=0. The second equation will be:
	(a) -6x + 10y - 4 = 0 (b) 6x - 10y - 4 = 0 (c) 6x + 10y - 4 = 0 (d) -6x + 10y + 4
17	If the equation $9x^2 + 6kx + 4 = 0$ has equal roots then k = ?
	(a) -2 or 0 (b) 0 only (c) 2 or 0 (d) 2 or -2
18	The angle of depression of a car, standing on the ground, from the top of a 75 m tower, is 30°. The distance of the car from the base of the tower (in metres) is
	(a) $25\sqrt{3}$ (b) $75\sqrt{3}$ (c) 150 (d) $50\sqrt{3}$
19	A quadratic polynomial, the sum of whose zeroes is 0 and one zero is 4, is
	(a) $x^2 - 16$ (b) $x^2 + 16$ (c) $x^2 + 4$ (d) $x^2 - 4$
20	In a formula racing competition, the time taken by two racing cars A and B to complete 1 round of the track is 30 minutes and p minutes respectively. If the cars meet again at the starting point for the first time after 90 minutes and the HCF $(30, p) = 15$, then the value of p is
	(a) 45 minutes (b) 60 minutes (c) 75 minutes (d) 180 minutes
21	Graphically, the pair of equations $6x - 3y + 10 = 0$ and $2x - y + 9 = 0$ represents two lines which are
	(a) intersecting at exactly one point (b) intersecting at exactly two points
	(c) coincident (d) parallel
22	If the quadratic equation $x^2 - 8x + k = 0$ has real roots, then
	(a) $k < 16$ (b) $k \le 16$ (c) $k > 16$ (d) $k \ge 16$
23	Two APs have the same common difference. The first term of one of these is -1 and that of the other is -8. Then the difference between their 4th terms is
	(a) -1 (b) -8 (c) 7 (d) -9
24	In given figure, PQRS is a parallelogram, if AT = AQ = 6 cm, AS = 3 cm and TS = 4 cm, then

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

25	In given figure, AT is a tangent to the circle with centre O such that OT = 4 cm and $\angle OTA = 30°$. Then AT is equal to	1

(a) 4 cm

(b) 2 cm

(c) $2\sqrt{3}$ cm

(d) $4\sqrt{3}$ cm

26	Two cubes each with 6 cm edge are joined end to end. The surface area of theresulting cuboid is (a) $180 \ cm^2$ (b) $360 \ cm^2$ (c) $300 \ cm^2$ (d) $260 \ cm^2$	1

27	A sphere of maximum volume is cut out from a solid hemisphere of radius 7 cm. Thenthe ratio of the volume of the original hemisphere to that of the cut-out sphere is (a) 2 : 1 (b) 16 : 1 (c) 3 : 1 (d) 4 : 1	1
28	In an MCQ test, a student guesses the correct answer x out of y times. If the probability that the student guesses the answer to be wrong is 2 then what is the relation between x and y (a) $y = 3x$ (b) $x = 3y$ (c) $3x = 2y$ (d) $2x = 3y$	1
–	**ASSERTION REASON BASED QUESTIONS:** In the question number 29 and 30, a statement of Assertion(A) is followed by astatement of Reason (R). Choose the correct answer out of the following choices **(a)** Both (A) and (R) are true and (R) is the correct explanation of (A). **(b)** Both A and (R) are true and (R) is not the correct explanation of (A). **(c)** (A) is true but (R) is false. **(d)** (A) is false but (R) is true.	
29	**Assertion(A):** Maximum value of (1/secθ) + (1/cosecθ) = 1 **Reason(R):** Maximum value of both $\sin \theta$ and $\cos \theta$ is 1	1
30	**Assertion(A):** The probability of getting a bad egg in a lot of 400 is 0.035. The numberof good eggs in the lot is 386. **Reason(R):** If the probability of an event is p, the probability of its complementary eventwill be 1-p	1

MATHS MCQs CLASS 10

1. A card is selected at random from a well shuffled deck of 52 playing cards. The probability of its being a face card

(a) 3/13   (b) 4/13   (c) 6/13   (d) 9/13

2. The ratio in which the line segment joining the points P(-3, 10) and Q(6, -8) is divided by O(-1, 6) is: (a) 1:3

     (b) 3:4   (c) 2:7   (d) 2:5

3. A box contains cards numbered 6 to 50. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square is :

(a) 1/45   (b) 2/15   (c) 4/45   (d) 1/9

4. In a circle of diameter 42cm, if an arc subtends an angle of $60°$ at the centre, then the length of the arc is:

(a) 22/7 cm   (b) 11cm   (c) 22 cm   (d) 44 cm

5. If the lines $3x + 2ky - 2 = 0$ and $2x + 5y + 1 = 0$ are parallel, then what is the value of k?

(a) 4/15   (b) 15/4   (c) ⅘   (d) 5/4

6. For the following distribution:

MARKS	Marks Below 10	Marks Below 20	Marks Below 30	Marks Below 40	Marks Below 50	Marks Below 60
NO OF STUDENTS	3	12	27	57	75	80

The modal class is

(a) 10-20   (b) 20-30   (c) 30-40   (d) 50-60

7. The distance of the point P (2, 3) from the x-axis is

(a) 2   (b) 3   (c) 1   (d) 5

8. A circus artist is climbing a 30 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 to the peg in the ground, if the angle made by the rope with the ground level is $30°$.

(a) $20\sqrt{3}$ m   (b) $15\sqrt{3}$ m   (c) $10\sqrt{3}$ m   (d) 20 m

Direction : In the question number 9 & 10 , A statement of Assertion (A) is followed by a statement of Reason(R). Choose the correct option

9. Assertion (A): The largest number that divide 70 and125 which leaves remainder 5 and 8 is 13
Reason (R): HCF (65,117) =13
(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 and R is false
(d) A is false and R is true

10. Assertion (A): In $\triangle ABC$, DE ǁ BC such that AD = (7x - 4) cm, AE = (5x - 2) cm, DB = (3x + 4) cm and EC = 3x cm than x equal to 5.

Reason (R): If a line is drawn parallel to one side of a triangle to intersect the other two sides in distant point, than the other two sides are divided in the same ratio.

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

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

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

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

11. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is:

(a) 1/9   (b) 2/9   (c) 1/6   (d) 1/12

12. A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is:

(a) 1/13   (b) 9/13   (c) 4/13   (d) 12/13

13. If θ is an acute angle of a right angled triangle, then which of the following equation is not true?
(a) $\sin\theta \cot\theta = \cos\theta$ (b) $\cos\theta \tan\theta = \sin\theta$ (c) $\csc^2\theta - \cot^2\theta = 1$ (d) $\tan^2\theta - \sec^2\theta = 1$

14. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then

(a) $a = -7, b = -1$ (b) $a = 5, b = -1$ (c) $a = 2, b = -6$ (d) $a = 0, b = -6$

15. If the sum of the first n terms of an A.P. be $3n^2 + n$ and its common difference is 6, then its first term is (a) 2
     (b) 3   (c) 1   (d) 4

16. The volume of a right circular cone whose area of the base is 156 cm² and the vertical height is 8 cm, is:

(a) 2496 cm³   (b) 1248 cm³   (c) 1664 cm³   (d) 416 cm³

17. The vertices of a parallelogram in order are A(1, 2), B(4, y), C(x, 6) and D(3, 5). Then (x, y) is:

(a) (6, 3)   (b) (3, 6)   (c) (5, 6)   (d) (1, 4)

18. A horse is tied to a pole with 28 m long rope. The perimeter of the field where the horse can graze is (Take $\pi = 22/7$)

(a) 60 cm   (b) 85 cm   (c) 124 cm   (d) 176 cm

19. The ratio of the volumes of two spheres is 8 : 27. The ratio between their surface areas is

(a) 2 : 3   (b) 4 : 27   (c) 8 : 9   (d) 4 : 9

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

(a) 36π cm²   (b) 18π cm²   (c) 12π cm²   (d) 9π cm²

21. A sphere of maximum volume is cut out from a solid hemisphere of radius 7 cm. Then the ratio of the volume of the original hemisphere to that of the cut-out sphere is
(a) 2 : 1   (b) 16 : 1   (c) 3 : 1   (d) 4 : 1

22. If $A(1,2)$, $B(4,3)$ and $C(6,6)$ are the three vertices of a parallelogram ABCD, then the coordinates of the fourth vertex D are

(a) $\left(\frac{1}{2}, 4\right)$ (b) $\left(\frac{7}{2}, 5\right)$ (c) (3,4)   (d) (3,5)

23. If mode of some data is 7 and their mean is also 7 then their median is
(a) 10   (b) 9   (c) 8   (d) 7

24. If we change the shape of an object from a sphere to a cylinder, then the volume of cylinder will
(a) Increase   (b) Decrease   (c) Remains unchanged   (d) Doubles

25. The wheel of a motorcycle is of radius 13 cm. The number of revolutions per minute must the wheel make so as to keep a speed of 66 km/hr will be

(a) 50   (b) 100   (c) 500   (d) 1000

26. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

(a) 7   (b) 14   (c) 21   (d) 28

27. A card is drawn from a deck of 52 cards. The event E is that card is not an ace of hearts. The number of outcomes favourable to E is

(a) 4   (b) 13   (c) 48   (d) 51

28. A right circular cylinder of radius r cm and height h cm (h>2r) just encloses a sphere of diameter

(a) r cm   (b) 2r cm   (c) h cm   (d) 2h cm

29. The class interval of a given observation is 10 to 15, then the class mark for this interval will be

(a) 11.5   (b) 12.5   (c) 12   (d) 14

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

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

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

ıge-8

CYCLIC TEST 2025-26

SUBJECT:-MATHEMATICS

CLASS : - X

IME:3HRS   M.Marks:80

INSTRUCTIONS:-

1. This Question Paper has 5 Sections A-E.

2. Section A has 20 MCQs carrying 1 mark each.

3. Section B has 5 questions carrying 02 marks each.

4. Section C has 6 questions carrying 03 marks each.

5. Section D has 4questions carrying 05 marks each.

6. Section E has 3 questions carrying 4 marks each.

SECTION-A

1. Which is not an irrational number?
   - .a) $5-\sqrt{3}$
   - b) $\sqrt{2}+\sqrt{5}$
   - c) $6+\sqrt{9}$
   - d) $4+\sqrt{2}$

2. A linear polynomial can have .... Zeroes.
   - a) 2 zeroes
   - b) 1 zero
   - c) No zero
   - d) At most 1 zero

3. If a pair of linear equations is consistent, then the lines will be:
   - a) Parallel
   - b) Always coincident
   - c) Intersecting or coincident
   - d) Always intersecting

4. The product of the roots of the equation $6x^2-7x+9=0$ is:
   - a)2/3
   - b) 3/2

c) 76

d) 79

5. In a quadratic equation , if D> 0 then its roots are:

a) Real and equal

b) Real and unequal

c) Not real roots

d) One root is real and other is imaginary

6. The LCM of $2^2 \times 3^3$ and $2^3 \times 3^2$ is

(a) 3^5

(b) 2^5

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

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

7. The pairs of equations $9x \div 3y \div 12 = 0$ and $18x \div 6y \div 26 = 0$ have

a) Unique solution

b) Exactly two solutions

c) Infinitely many solutions

d) No solution.

8. The quadratic equation $2x^2 - \sqrt{5}x \div 1 = 0$ has

(a) two distinct real roots

(b) two equal real roots

(c) no real roots

(d) more than 2 real roots

9. The sum of roots of quadratic equation is $-x^2 \div 3x \div 3 = 0$ is:

a) 3

b) 2

c) -3

d) 1

10. The product of a rational and irrational number is
     (a) rational
     (b) irrational
     (c) both of above
     (d) none of above

11. Express 98 as a product of its primes
     (a) $2^2 \times 7$
     (b) $2^2 \times 7^2$
     (c) 2×7^2
     (d) $2^3 \times 7$

12. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is
     (a) 10
     (b) -10
     (c) 5
     (d) -5

13. A quadratic polynomial, whose zeroes are 3 and -4, is
     (a) $x^2 - x - 12$
     (b) $x^2 + x + 12$
     (c) $2x^2 + 2x - 24$
     (d) none of above

14. Which of the following is not the graph of quadratic polynomial?
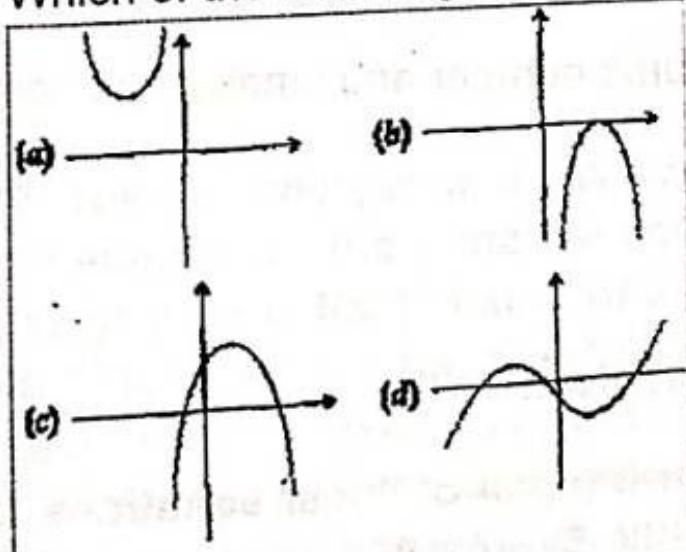
15. What is the number of zeroes that a linear polynomial has/have:
    (a) 0
    (b) 1
    (c) 2
    (d) 3

16. If the lines given by 2x + ky = 1 and 3x – 5y = 7 are parallel, then the value of k is

    (a) $\frac{-10}{3}$

    (b) $\frac{10}{3}$

    (c) – 13

    (d) – 7

17. Find zeroes of the quadratic polynomial $x^2+7x+10$?
    a) 2 and 5
    b) 5 and -2
    c) -2and -5
    d) -5 and 2

18. Which of the prime factorization is not correct?
    a) 2x3x5
    b) $2x3x5^2x1$
    c) 2x3x5
    d) $2x3^2x5$

19. If α and β are zeroes of a quadratic polynomial $ax^2+bx+c=0$, then sum of zeroes is equal to:
    a) ab
    b) a-b
    c) a/b
    d) -b/a

20. What is the HCF of the smallest prime number and smallest composite number:
    a) 2
    b) 4
    c) 1
    d) 3

SECTION- B

21. For what value of m the following pair of linear equations has no solution. 4x + m y - 8 = 0 and 3x -5y +7 = 0

22. Prove that $3+2\sqrt{7}$ is an irrational number, given that $\sqrt{7}$ is an irrational number.

23. Find the quadratic equation, whose zeroes are 4 and -4.

24. Explain why $5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

25. Find two numbers whose sum is 27 and product is 182.

SECTION - C

26. Prove that $\sqrt{3}$ is irrational.

27. Check whether 6^n can end with the digit 0 for any natural number n.

28. Find the values of k for each of the following quadratic equations so that they have two equal roots.
(i) $2x^2 + kx + 3 = 0$

29. Find the zeroes of the following quadratic polynomial and verify the relationship between the zeroes and their coefficients: $4u^2 + 8u$

30. Solve the following pair of linear equations by the elimination method and the substitution method:

$3x + 4y = 10$ and $2x - 2y = 2$

31. The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.

SECTION-D

32. The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is Rs 105 and for a journey of 15 km, the charge paid is Rs 155. What are the fixed charges and the charge per km? How much does a person have to pay for travelling a distance of 25 km?

33. The coach of a cricket team buys 3 bats and 6 balls for Rs.3900. Later, she buys another bat and 3 more balls of the same kind for Rs.1300. Represent this situation algebraically and geometrically.

34. i) Find the LCM and HCF of the following pairs of integers and verify that LCM × HCF = product of the two numbers a) 510 and 92

ii) Find HCF and LCM of 26 and 91 by prime factorization.

35. Solve the following pair of linear equations by substitution method:

$\sqrt{2}\ x + \sqrt{3}\ y = 0$

$\sqrt{3}\ x - \sqrt{8}\ y = 0$

SECTION-D

CASE STUDY 1

b) Basketball and soccer are played with a spherical ball. Even though an athlete dribbles the ball in both sports, a basketball player uses his hands and a soccer player uses his feet. Usually, soccer is played outdoors on a large field and basketball is played indoor on a court made out of wood. The projectile (path traced) of soccer ball and basketball are in the form of parabola representing quadratic polynomial.

a) The shape of the path traced is:

    a) Spiral

    b) Ellipse

    c) Linear

    d) Parabola

b) The graph of parabola opens upwards, if _____

    i) $a \leq 0$

    ii) $a < 0$

    iii) $a > 0$

    iv) $a = 0$

c) In the graph, how many zeroes are there for the polynomial?
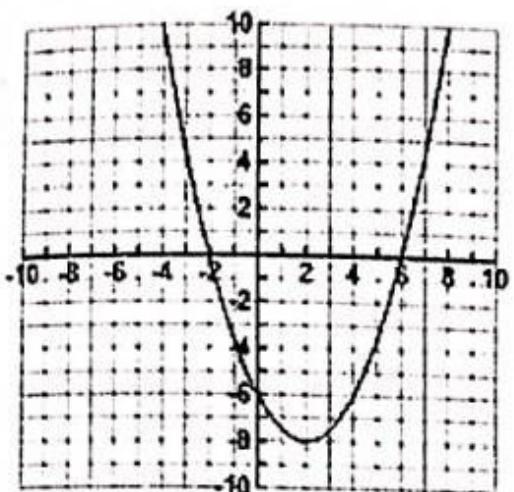
i)   0

ii) 1

iii) 2

iv) 3

d)The two zeroes in the above shown graph are:

i)   2, 6

ii)   -2, 6

iii)   -6, 2

iv)   2,6

CASE STUDY 2

To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections- section A and section B of grade X. There are 32 students in section A and 36 students in section B.

1. What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?

a) 144   b) 128

c) 288   d) 272

2. If the product of two positive integers is equal to the product of their HCF and LCM is true then, the HCF (32 , 36) is

a) 2   b) 4

c) 6   d) 8

3.Write 36 as a product of its primes ?

CASE STUDY 3

A coaching institute of Mathematics conducts classes in two batches I and II and fees for rich and poor children are different. In batch I, there are 20 poor and 5 rich children, whereas in batch II, there are 5 poor and 25 rich children. The total monthly collection of fees from batch I is ₹ 9000 and from batch II is ₹ 26000 . Assume that each poor child pays ₹ x per month and each rich child pays ₹ y per month.
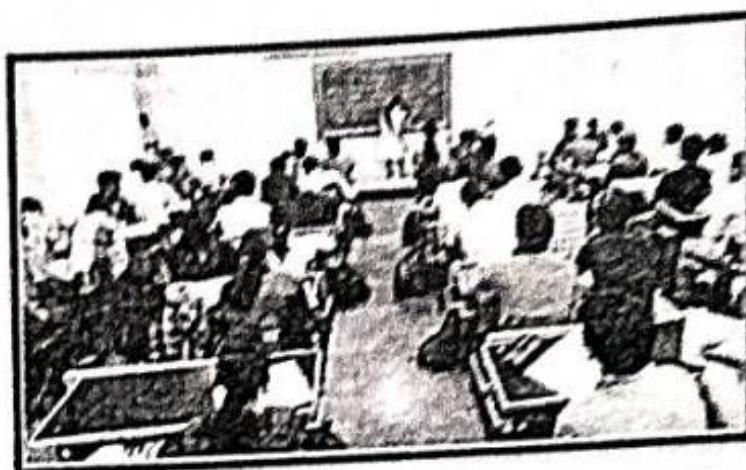
Based on the given information, solve the following questions:

Q. 1. Represent the information given above in terms of x and y for batch 1

    a) $20x+5y=9000$

    b) $5x+20y=9000$

    c) $20x-5y=9000$

    d) $20x+5y=26000$

Q. 2. Represent the information given above in terms of x and y for batch 2.

    a) $25x+5y=26000$

    b) $5x+25y=26000$

    c) $5x-25y=26000$

    d) $5x+25y=9000$

3.The given pair of equations have:

    a) No solution

    b) Unique solution

    c) Infinite solutions

    d) , Cannot say anything.

****

PERIODIC TEST-II (2025-2026)
CLASS – X
MATHEMATICS

Time: 90 Minutes   **Maximum Marks: 40**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.

2. Section A has 8 MCQs carrying 1 mark each

3. Section B has 4 questions carrying 02 marks each.

4. Section C has 2 questions carrying 03 marks each.

5. Section D has 2 questions carrying 05 marks each.

6. Section E has 2 case based questions carrying 04 marks each.

	SECTION A	
	Section A consists of 8 questions of 1 mark each.	
1.	The coordinate of point P on X-axis equidistant from the points A (−1, 0) and B (5, 0) is (a) (2, 0) (b) (0, 2) (c) (3, 0) (d) (2, 2)	1
2.	In ABC right angled at B, $\sin A = 7/25$, then the value of $\cos C$ is (a) 7/25	1

(b) 24/25
(c) 7/24
(d) 24/7

3. In the △ABC, DE ‖ BC and AD = 3x – 2, AE = 5x – 4, BD = 7x – 5, CE = 5x – 3, then find the value of x   1

(a) 1
(b) 7/10
(c) both (a) & (b)
(d) none of these

4. In the given figure, PT is a tangent at T to the circle with centre O. If ∠TPO = 25°, then x is equal to: 1
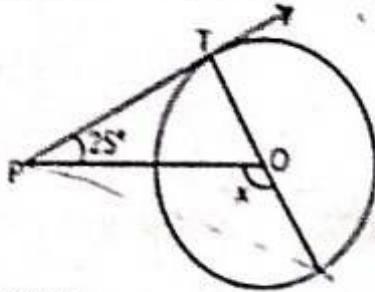
(a) 25°
(b) 65°
(c) 90°
(d) 115°

5. If tan θ = 1, then the value of sec θ + cosec θ is: 1

(a) 3√2
(b) 4√2
(c) 2√2
(d) √2

6. A stone is 15√3 m away from a tower 15 m high, then the angle of elevation of the top of the tower from the stone is: 1

(a) 45°
(b) 60°
(c) 30°
(d) 90°

DIRECTION: In this question, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option

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

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

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

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

7.	Assertion (A): D and E are points on the sides AB and AC respectively of a $\triangle ABC$ such that AD = 5.7cm, DB = 9.5cm, AE = 4.8cm and EC = 8cm then DE is not parallel to BC. Reason (R): If a line divides any two sides of a triangle in the same ratio then it is parallel to the third side.	1
8.	Assertion (A): A circle can have infinitely many tangents Reason (R): The tangent at any point of a circle is perpendicular to the radius through the point of contact.	1.

	SECTION-B	
	Section B consists of 4 questions of 2 marks each.	
9.	If sin (A + B) = √3/2 and sin (A – B) = 1 2 , 0 ≤ A + B ≤ 90° and A > B, then find A and B.	2

Based on the above information, answer the following questions:

(I) Taking O as origin, coordinates of P are (−200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S?

(II) If S divides CA in the ratio K : 1, what is the value of K, where point A is (200, 800) ?

(III What is the area of square PQRS ?

OR

(iv) What is the length of diagonal PR in square PQRS?

18

A Ferris wheel is an amusement ride consisting of a rotating upright wheel with multiple passenger carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity.

After taking a ride in Ferris wheel, Monika came out from the crowd and was observing her friends who were enjoying the ride. She was curious about the different angles and measures that the wheel will form. She forms the figure as given below.
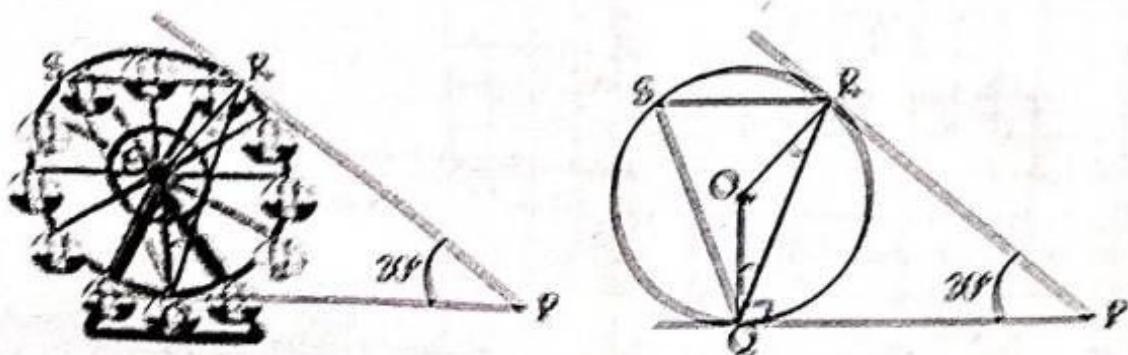
(i) In the given figure, find ∠ROQ.   1

(ii) Find the measure of ∠RQP.

(iii) Find measure of ∠RSQ.   1

OR

(iv)Find the sum of ∠ORP and ∠OQP.   2

LORETO CONVENT SCHOOL, DELHI CANTT

MID TERM EXAMINATION (2025 – 26)

CLASS X - MATHEMATICS

Time: 3 Hours

Max. Marks: 80

<u>GENERAL INSTRUCTIONS:</u>

1. This question paper contains 38 questions. All questions are compulsory.
2. Question paper is divided into five sections A, B, C, D & E.
3. Section A has 18 MCQ's and 2 Assertion – Reason based questions of 1 mark each.
4. Section B has 5 very short answer type questions of 2 marks each.
5. Section C has 6 short answer type questions of 3 marks each.
6. Section D has 4 long answer type questions of 5 marks each.
7. Section E has 3 source based/case based/integrated units of assessment of 4 marks each with sub parts.
8. Number of graph sheet required: 1
9. Number of printed sheets: 6

SECTION – A

(20 questions of 1 mark each)

Q1. One card is drawn at random from a well shuffled deck of 52 cards. The probability of getting a face card is

(a) $\frac{1}{2}$

(b) $\frac{3}{13}$

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

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

Q2. The empirical relation between the mode, median and mean of a distribution is

(a) Mode = 3 Median – 2 Mean

(b) Mode = 2 Median – 3 Mean

(c) Mode = 3 Mean – 2 Median

(d) Mode = 2 Mean – 3 Median

Q3. If the altitude of a sun is 60°, then the height of the vertical tower that will cast a shadow of length 30m is

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

(b) 15 m

(c) $\sqrt{3}$

(d) $15\sqrt{3}$

Q4. If triangle ABC is right angled at C, then the value of cos (A + B) is

(a) 0

(b) 1

(c) $\frac{1}{2}$

(d) not defined

Q5. If in triangles ABC and DEF, $\frac{AB}{EF} = \frac{AC}{DE}$, then they will be similar if:

(a) $\angle A = \angle D$

(b) $\angle A = \angle E$

(c) $\angle B = \angle E$

(d) $\angle C = \angle F$

Q6. A bag contains 5 pink, 8 blue and 7 yellow balls. One ball is drawn at random from the bag. What is the probability of getting neither blue nor a pink ball?

(b) $\frac{1}{4}$

(b) $\frac{2}{5}$

(c) $\frac{7}{20}$

(d) $\frac{13}{20}$

1

Q7. The 11th term from the end of the AP: 10, 7, 4, ..., -62 is:

(a) 25
(b) 16
(c) -32
(d) 0

Q8. The ratio in which the x - axis divides the line segment joining the points (2, -3) and (6, 7) is:

(a) 1 : 3
(b) 3 : 7
(c) 7 : 3
(d) 1 : 2

Q9. The distance between the point (a, b) and (0, 0) is

(a) $\sqrt{a^2 + b^2}$
(b) $2\sqrt{a^2 + b^2}$
(c) $\sqrt{3a^2 + 3b^2}$
(d) $4\sqrt{a^2 + b^2}$

Q10. If the prime factorisation of 2520 is $2^3 \times 3^A \times B \times 7$, then the value of A + 2B is

(a) 12
(b) 10
(c) 9
(d) 7

Q11. If LCM (x, 18) = 36 and HCF (x, 18) = 2, then x is:

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

Q12. Four groups in a class were asked to come up with an arithmetic progression Shown below are their responses:

(i)   Group M: 4, 2, 0, -2, ...
(ii)   Group N: 41, 38.5, 36, 33.5, ...
(iii)   Group O: -19, -21, -23, -25, ...
(iv)   Group P: -3, -3, -3, -3

Which of the groups correctly came up with an AP?

(a) (i) & (iii)
(b) (ii) & (iii)
(c) (i), (ii) & (iii)
(d) all are correct

Q13. The total number of factors of a prime number is:

(a) 1
(b) 0
(c) 2
(d) 3

Q14. The pair of linear equations 3x - y + 8 = 0 and 6x - qy + 16 = 0 represent coincident lines, then the value of q is:

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

Q15. If α & β are the zeroes of the polynomial $2x^2 - x - 1$ then $\alpha^2 + \beta^2$ is equal to:

(a) $\frac{-3}{4}$
(b) $\frac{5}{4}$
(c) $\frac{1}{4}$
(d) $\frac{3}{4}$

Q16. In triangle ABC, PQ ∥ BC. If PB = 6cm, AP = 4cm and AQ = 8cm, then the length of AC is
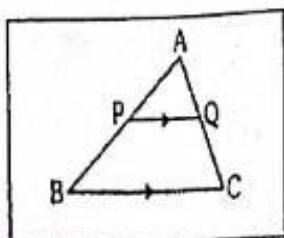
(a) 12cm
(b) 20cm
(c) 6cm
(d) 14cm

Q17. Simplest form of $\frac{1+\tan^2 x}{1+\cot^2 x}$ is

(a) Sin²x   (b) Tan²x   (c) Sec²x   (d) Cot²x

Q18. The pair of linear equations x + 2y + 5= 0 and -3x +6y -1 = 0 has

(a) Unique solution   (c) exactly two solutions
(b) Infinitely many solutions   (d) no solution

The following questions are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as (R). Select the correct answer to these questions:

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

Q19. Assertion (A): The graph y = f(x) is shown in the figure, for the polynomial f(x). The number of zeroes of f(x) is 4.

Reason (R): The number of zeroes of the polynomial f(x) is the number of points at which f(x) cuts or touches both the axes.
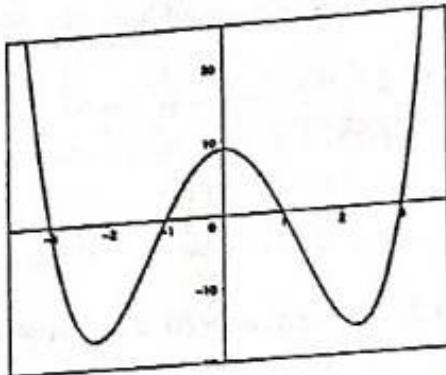
Q20. Assertion (A): If sin A = $\frac{3}{5}$, then cos²A = $\frac{16}{25}$
    Reason (R): sin²A + cos²A = 1

SECTION - B

(5 questions of 2 marks each)

Q21. A ladder makes an angle of 60° with the ground when placed against the wall. If the foot of the ladder is 2.5 m away from the wall, then find the length of the ladder.

Q22. Two different dice are tossed together. Find the probability of:

(i)   getting a doublet
(ii) getting a sum 10, of the numbers on the two dice.

3

Q23(A). Find the mode of the given frequency distribution:

Class Intervals	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65	65 - 75
Frequency	6	11	22	23	14	5

OR

Q23(B). Weights of 40 eggs were recorded as given below:

Weight (in gms)	85 - 89	90 - 94	95 - 99	100 - 104	105 - 109
Number of eggs	10	12	12	4	2

Find the lower limit of the median class.

Q24. Two straight paths are represented by the equations $x - 2y = 2$ and $-2x + 2y = 5$. Check whether the paths cross each other or not.

Q25. Find a quadratic polynomial whose zeroes are $(5 - 3\sqrt{2})$ and $(5 + 3\sqrt{2})$.

SECTION – C

(6 questions of 3 marks each)

Q26. Find the median of the following data:

Class Intervals	500 - 600	600 - 700	700 - 800	800 - 900	900 - 1000
Frequency	36	32	32	20	30

Q27. In an AP, if the first term $a = 7$, nth term $a_n = 84$ and the sum of first n terms $S_n = \frac{2093}{2}$, then find value of n.

Q28(A). Show that $2 + 3\sqrt{5}$ is not a rational number.

OR

Q28(B). In a school there are two sections – section A and section B of class X. There are 32 students in section A and 36 students in section B. Determine the minimum number of books required for their class library so that they can be distributed equally among the students of section A and section B.

Q29. Points A (-1, y) and B (5, 7) lie on a circle with centre O (2, -3y) such that AB is a diameter of the circle. Find the value of y. Also find the radius of the circle.

Q30. In the given figure, ABCD is a trapezium with AB∥ DC. If △ AOD ~ △ BOC, then prove that AD = BC.
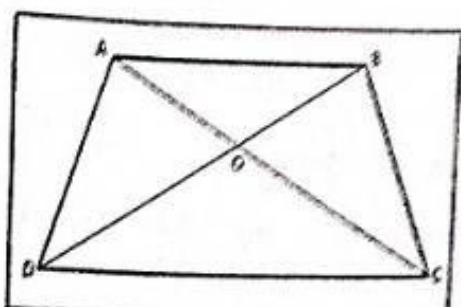
Q31(A). If $\cot A = 1$, then find the value of $\dfrac{\sec^2 A - \tan^2 A}{\sin^2 A} + \sin 0°$

OR

Q31(B). Evaluate: $\dfrac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \sin^2 60°}$

SECTION - D

(4 questions of 5 marks each)

Q32. If the mean of the following frequency distribution table is 91. Find the missing frequencies x and y

Class Intervals	0 - 30	30 - 60	60 - 90	90 - 120	120 - 150	150 - 180	Total
Frequency	12	21	x	52	y	11	150

Q33(A). Solve the pair of linear equations and find the value of 'x' & 'y' :

$$ax + by = a - b, \quad ax - by = a + b$$

OR

Q33(B). Solve the following system of linear equations graphically: $2x + y = 6$; $x - 2y + 2 = 0$. Find the vertices of the triangle formed by the above two lines and the x- axis. Also find the area of the triangle.

Q34. State and prove Basic Proportionality Theorem.

In the given figure, PQ∥ CB and PR ∥ CD, using the above theorem prove that $\dfrac{QB}{AQ} = \dfrac{RD}{AR}$
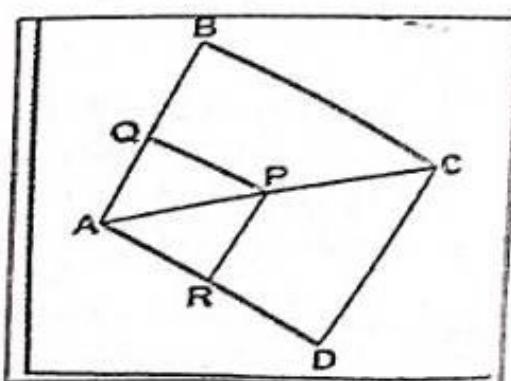
Q35. Prove that $\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\tan A} = 1 + \sec A \, \csc A$

SECTION - E

(3 case study-based questions of 4 marks each)

Q36. India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs.

The production of TV sets in a factory increases uniformly by fixed number every year. It produced 16000 sets in the 6th year and 22600 in the 9th year.

Based on the above information answer the following questions:

(i)   What is the fixed number increase in production of factory every year?   (1)

(ii)   What is the production in the first year?   (1)

(iii) Find the total production during the first three years.   (2)

Q37. An amusement park in Mumbai offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all age groups. The park is known for its water kingdom section, making it a popular destination for all family outings and fun filled adventures. The ticket for the park is ₹150 per child and ₹250 per adult.

On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹55,000 was collected.

Based on the above information, answer the following questions:

(i)   If the number of children visited is x and the number of adults visited is y, then write the given situation algebraically.   (1)

(ii)   How many children visited the park that particular day?   (1)

(iii) How much amount will be collected if 250 children and 100 adults visit the amusement park?   (2)

Q38. Trigonometry in the form of triangulation forms the basis of navigation, whether it is by land, sea or air. GPS a radio navigation system helps to locate our position on earth with the help of satellites.
A guard, stationed at the top of 240m tower, observed an unidentified boat coming towards it. A clinometer or inclinometer is an instrument used for measuring angles or slopes(tilt). The guard used the clinometer to measure the angle of depression of the boat coming towards the light house and found out to be 30°.

(i)   Make a labelled figure on the basis of the given information.   (1)

(ii)   calculate the distance of the boat from the foot of the observation tower.   (1)

(iii) After 10 minutes, the guard observed that the boat was approaching the tower and the angle of depression changes to 45°. How far is boat from the foot of the tower.   (2)

****

PM SHRI KENDRIYA VIDYALAYA NO 1 DELHI CANTT

Diagnostic Test (2025-26)

SUBJECT: MATHEMATICS

CLASS: X

Time: 3:00 Hours

MM:80

General Instructions:
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-based questions (4 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory.

SECTION A

Section A consists of 20 questions of 1 mark each.

Q.1	The least number divided by both 16 and 18 is: (a) 124 (b) 144 (c)134 (d) 114	1
Q.2	The zeroes of t^2-15 are: (a) $\sqrt{3}$ and $-\sqrt{3}$ (b) $\sqrt{15}$ and $-\sqrt{15}$ (c) $-\sqrt{5}$ and $\sqrt{5}$ (d) $\sqrt{15}$ and $\sqrt{3}$	1
Q.3	If the lines given by $3x + 3ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then the value of k is (a) $\frac{-5}{4}$ (b) $\frac{2}{5}$ (c) $\frac{5}{2}$ (d) $\frac{3}{2}$	1
Q.4	A polynomial of degree 3 is called .... polynomial (a) linear (b) cubic (c) quadratic (d) zero	1
Q.5	The degree of the polynomial $x^2- \sqrt{2}\,x + 2$ (a) 2 (b) 3 (c) 4 (d) 5	1
Q.6	Number of solutions of pair $x - 2y = 0$ and $3x + 4y = 20$ is: (a) Unique (b) Infinitely many (c) No solution (d) Can't say	1
Q.7	Which of the following is irrational? (a) $\frac{7}{5}$ (b) 0.333... (c) $\sqrt{3}$ (d) 0.5	1

Q.8 If the sum and product of zeroes are 4 and 1, then the polynomial is:

(a) $x^2 - 4x - 1$

(b) $x^2 - 4x + 1$

(c) $x^2 + 4x + 1$

(d) $x^2 + 4x - 1$

Q.9 If one zero of the quadratic polynomial $x^2 + 7x + k$ is 2, then the value of k is:

(a) 10   (b) -10   (c) 18   (d) -18

Q.10 Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$

(a) -2 and -5 (b) 2 and 5

(c) -5 and 2 (d) 5 and -2

Q.11 15 students of class X took part in a mathematics quiz. If the number of girls is 5 more than the number of boys, find the number of boys and girls who took part in the quiz?

(a) girls=8, boys =7   (b) girls=5, boys =10

(c) girls=10, boys =5   (d) girls = 5, boys = 10

Q.12 An army contingent of 720 members has to march behind an army band of 40 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

(a) 20   (b) 30   (c) 40   (d) 10

Q.13 Which of the following are the zeroes of the cubic polynomial $2x^3 + x^2 - 5x + 2$

(a) 0   (b) -1   (c) -2   (d) 1

Q.14 Every _____ number can be expressed (factorized) as a product of primes, and this factorization is unique, apart from the order in which the prime factors occur

(a) prime   (b) composite   (c) even   (d) odd

Q.15 $6x + 12$ is an --------

(a) expression   (b) equation   (c) value   (d) none of the above   1

Q.16 What are the LCM and HCF of 17, 23 and 29?

(a) 13139, 1   (b) 31319, 1   (c) 33119, 1   (d) 11339, 1   1

Q.17 Coincident lines have ....solution(s)

(a) zero   (b) only one   (c) infinitely many   (d) none of the above   1

Q.18 There is a circular path around a sports field. Rohan takes 20 minutes to drive one round of the field. While Ankit takes 15 minutes for the same. Suppose they both start at the same point and at the same time and go in the same direction. After how many minutes will they meet again at the starting point?   1

(a) 60 minutes   (b) 55 minutes   (c) 50 minutes   (d) 45 minutes

Q 19 (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

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

Q20 (c) Assertion (A) is true but Reason (R) is false.

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

| Q.19	Assertion (A) : If HCF of two numbers is 15 and LCM is 105. Then the product of the two numbers is 1575 Reason (R) : If a and b are two positive integers then HCF X LCM =a X b	1
Q.20	Assertion (A) : If two lines are coincident then, they have infinite solutions and pair of linear equations is consistent. Reason (R) : If the pair of lines are parallel, then we say that pair is consistent and it has unique solution	1

SECTION B

Section B consists of 5 questions of 2 mark each.

21	Explain why $7 \times 11 \times 13 + 13$ is a composite number.	2
22	Check whether 4^n can end with the digit 0 for any natural number	2
23	Find a quadratic polynomial with sum and product of zeroes as $0, \sqrt{5}$	2
24	The graph of y=p(x) are given , for some polynomials p(x). Find the number of zeroes of p(x) in each case	2
25	Given that HCF (180 , 420) = 60 , Find LCM (180 ,420)	2

SECTION C

Section C consists of 6 questions of 3 mark each.

26	Prove that $\sqrt{2}$ is irrational.	3
27	Find the zeroes of the quadratic polynomial $3x^2 -x-4$ and verify the relationship between the zeroes and the coefficients.	3

28	Solve the following pair of linear equations by Substitution method $0.2x + 0.3y = 1.3$ $0.4x + 0.5y = 2.3$	3
29	On comparing the ratios $\frac{a1}{a2}, \frac{b1}{b2}, \frac{c1}{c2}$, find out whether the following pair of linear equations are consistent or inconsistent $2x - 3y = 8$; $4x - 6y = 9$	3
30	Solve the following pair of linear equations by Elimination method $3x + 4y = 10$; $2x - 2y = 2$	3
31	Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu?	3

SECTION D

Section D consists of 4 questions of 5 mark each.

32	Solve the following pair of equations, graphically: $x + 3y = 6$ and $2x - 3y = 12$ Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis and shade the triangular region.	5
33	Prove that :- (i) $5\sqrt{3}$ is irrational (ii) $2 + 3\sqrt{3}$ is irrational (Given $\sqrt{3}$ *is irrational*)	5
34	The sum of a two-digit number and the number obtained by reversing the digits is 88. If the digits of the number differ by 4, find the number.	5
35	A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Rashi paid 32 for a book kept for 6 days, while Priya paid 24 for the book she kept for 4 days. Find the fixed charge and the charge for each extra day.	5

SECTION E

Section E consists of 3 questions of 4 mark each.

A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.
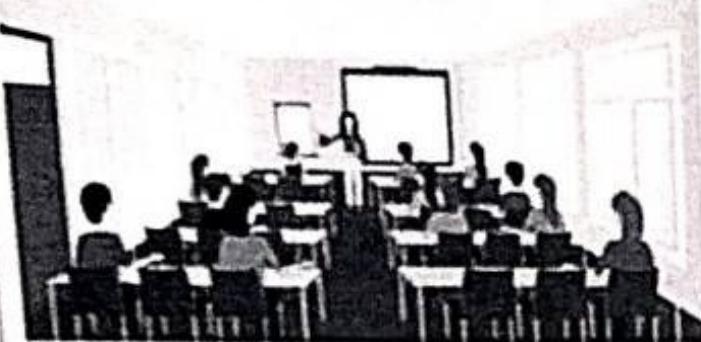
(i) In each room the same number of participants are to be seated and all of them being in the same position, hence the maximum number participants that can be accommodated in each room are

a) 14
b) 12
c) 16
d) 18

(1+1+2)

(ii) What is the minimum number of rooms required during the event?

a) 11
b) 31
c) 41
d) 21 ✓

(iii) The LCM of 60, 84 and 108 is

a) 3780
b) 3680
c) 4780
d) 4680

---

37 | Basketball and soccer are played with a spherical ball. Even though an athlete dribbles the ball in both sports, a basketball player uses his hands, and a soccer player uses his feet. Usually, soccer is played outdoors on a large field and basketball is played indoor on a court made out of wood. The projectile (path traced) of soccer ball and basketball is shown in the figure.

(1+1+2)

1. The shape of the path traced shown is

a) Spiral
b) Ellipse
c) Linear
d) Parabola

2. The graph of parabola opens upwards, if

a) a = 0
b) a < 0
c) a > 0
d) a 0

3. Observe the following graph and answer

In the above graph, how many zeroes are there for the polynomial?

The three zeroes in the above shown graph are

| 38. | Payal went to a stationary shop and purchased 2 pencils and 3 erasers for ₹ 10. Her friend Monali saw the new variety of pencils and erasers with Payal, and she also bought 4 pencils and 6 erasers for ₹ 20 | | |

(i) What is the algebraic equation from Payal's information?
(a)2x-3y=9
(b)2x+3y=10
(c)3x+2y=10
(d)2x+3y=9

(ii) What is the algebraic equation from Monali's information?
(a)4x-6y=18
(b)4x-6y=20
(c)4x+6y=20
(d)4x+3y=18

(iii)What can be concluded if both the equations are plotted on graph?(write also reason)
(a)the lines are coinciding
(b)the lines are parallel
(c) the lines are perpendicular
(d)the lines are intersecting
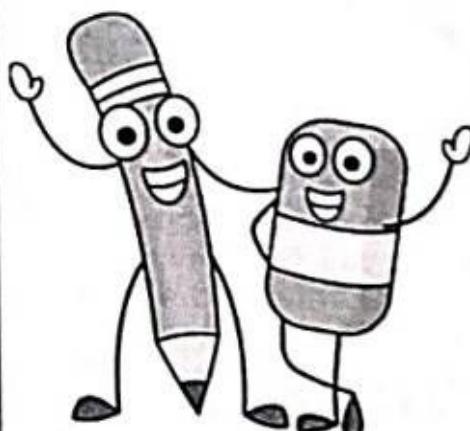
(1+1+2)

p-8   **Diagnostic Test (2025-26)**
                              CLASS: X
                       SUBJECT: MATHEMATICS
MM:80   Time: 3:00 Hours

General Instructions:
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-based questions (4 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory.

SECTION A

Section A consists of 20 questions of 1 mark each.

The least number divided by both 16 and 18 is:
(a) 124

Q.1 · (b) 144
(c)134
(d) 114   1

Q.2 The sum of first 16 terms of the AP: 10, 6, 2,... is
. (a) −320 (b) 320 (c) −352 (d) −400   1

If the lines given by 3x + 3ky = 2 and 2x + 5y + 1 = 0 are parallel, then the value of k is

Q.3
(a) $\frac{-5}{4}$ (b) $\frac{2}{5}$ (c) · $\frac{5}{2}$ (d) $\frac{3}{2}$ 1

A polynomial of degree 3 is called .... polynomial

Q.4
(a) linear   (b)cubic   (c) quadratic   (d) zero   1

Q.5 The degree of the polynomial $x^2 - \sqrt{2}\,x + 2$ 1

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

Number of solutions of pair $x - 2y = 0$ and $3x + 4y = 20$ is:

Q.6 (a) Unique   (b) Infinitely many   1
     (c) No solution   (d) Can't say

Which of the following is irrational?

Q.7 (a) $\frac{\pi}{5}$ (b) 0.333...   (c) $\sqrt{3}$ (d) 0.5   1

If the sum and product of zeroes are 4 and 1, then the
polynomial is: 1

Q.8
     (a) $x^2 - 4x - 1$ (b) $x^2 - 4x + 1$
     (c) $x^2 + 4x + 1$ (d) $x^2 + 4x - 1$

If one zero of the quadratic polynomial $x^2 + 7x + k$ is 2 ,
Q.9 then the value of k is :   1
     (a) 10   (b) -10   (c) 18   (d) -18

     Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$
Q.10 (a) -2 and -5 (b) 2 and 5   1
     (c) -5 and 2   (d) 5 and -2

     15 students of class X took part in a mathematics quiz. If
     the number of girls is 5 more than the number of boys, find
     the number of boys and girls who took part in the quiz?   1
Q.11 (a) girls=8 , boys =7   (b) girls=5 , boys =10
     (c) girls=10, boys =5   (d) $girls = 5, boys = 10$

     An army contingent of 720 members has to march behind
     an army band of 40 members in a parade. The two groups
     are to march in the same number of columns. What is the   1
Q.12 maximum number of columns in which they can march?

     (a) 20   (b) 30   (c) 40   (d) 10

Q.13 Which of the following are the zeroes of the cubic
     polynomial $2x^3 + x^2 - 5x + 2$
     (a) 0   (b) -1   (c) -2   (d) 1   1

     Every _____ number can be expressed (
Q.14 factorized) as a product of primes , and this factorization is   1

unique, apart from the order in which the prime factors occur

(a) prime · (b)composite (c) even (d) odd

6x +12 is an --------

.15 ·(a) expression (b) equation (c)value (d) 1
none of the above

What are the LCM and HCF of 17, 23 and 29?

16
(a) 13139 , 1 (b) 31319 ,1 (c) 33119 ,1 (d) 1
(d) 11339 ,1
Coincident lines have ....solution(s)

17 (a) zero (b) only one 1
. (c)infinitely many (d) none of the above

18 30th term of the A.P: 10, 7, 4, ..., is
(a) 97. (b) 77. (c) -77. (d) -87 1
In questions 19 and 20 choose the correct options given below :

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

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

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

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

Assertion (A) : If HCF of two numbers is 15 and LCM is
19 105. Then the product of the two numbers is 1575

Reason (R) : If a and b are two positive integers then HCF X LCM =a X b
1

Assertion (A) : If two lines are coincident then, they have infinite solutions and pair of linear equations is consistent.

20 Reason (R) : If the pair of lines are parallel, then we say   1
that pair is consistent and it has unique solution

SECTION B

Section B consists of 5 questions of 2 mark each.

21 Explain why 7 × 11 × 13 + 13 is a composite number.
                                                                    2

22 Check whether 4^n can end with the digit 0 for any natural   2
number

23 Find a quadratic polynomial with sum and product of   2
zeroes as $0, \sqrt{5}$

24
The graph of y=p(x) are given , for some polynomials
p(x).

Find the number of zeroes of p(x) in each case   2

25 Given that HCF (180 , 420) = 60 , Find LCM (180 ,420)   2

SECTION C

Section C consists of 6 questions of 3 mark each.

26 How many two digits numbers are divible by 3
                                                                    3

27 Find the zeroes of the quadratic polynomial $3x^2 - x - 4$ and
verify the relationship between the zeroes and the   3
coefficients.

Which term of the A.P.: 3, 15, 27, 39, ... will be 120
28 more than its 21st term?
                                                                    3

29 On comparing the ratios $\frac{a1}{a2}$, $\frac{b1}{b2}$, $\frac{c1}{c2}$, find out whether the following pair of linear equations are consistent or inconsistent

2x -3 y = 8 ; 4x -6 y = 9

3

30 Solve the following pair of linear equations by Elimination method

3x +4 y = 10 ; 2x -2 y = 2

3

31 Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu?

3

SECTION D

Section D consists of 4 questions of 5 mark each.

32 Solve the following pair of equations, graphically:

x + 3y =6 and 2x - 3y = 12

Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis and shade the triangular region.

5

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

5

34 The sum of a two-digit number and the number obtained by reversing the digits is 88. If the digits of the number differ by 4, find the number.

5

35 A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Rashi paid 32 for a book kept for 6 days, while Priya paid 24 for the book she kept for 4 days. Find the fixed charge and the charge for each extra day.

5

SECTION E

Section E consists of 3 questions of 4 mark each.

36

A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

(1+1 2)

(i) In each room the same number of participants are to be seated and all of them being in the same position, hence the maximum number participants that can be accommodated in each room are

a) 14   b) 12

c) 16   d) 18

(ii) What is the minimum number of rooms required during the event?

a) 11   b) 31

c) 41   d) 21

(iii) The LCM of 60, 84 and 108 is

a) 3780   b) 3680

c) 4780   d) 4680

37

Basketball and soccer are played with a spherical ball. Even though an athlete dribbles the ball in both sports, a basketball player uses his hands, and a soccer player uses his feet. Usually, soccer is played outdoors on a large field and basketball is played indoor on a court made out of wood. The projectile (path traced) of soccer ball and basketball is shown in the figure.

(1+1+ 2)

1. The shape of the path traced shown is
   a) Spiral   b) Ellipse
   c) Linear   d) Parabola

2. The graph of parabola opens upwards, if _____
   a) a = 0   b) a < 0.
   c) a > 0   d) a 0

3. Observe the following graph and answer

In the above graph, how many zeroes are there for the polynomial?

The three zeroes in the above shown graph are

----

38. Payal went to a stationary shop and purchased 2 pencils
    and 3 erasers for ₹ 10. Her friend Monali saw the new
    variety of pencils and erasers with Payal, and she also
    bought 4 pencils and 6 erasers for ₹ 20   (1+1+2)

(i) What is the algebraic equation from Payal's information?
(a)2x-3y=9
(b)2x+3y=10
(c)3x+2y=10
(d)2x+3y=9

(ii) What is the algebraic equation from Monali's information?
(a)4x-6y=18
(b)4x-6y=20
(c)4x+6y=20
(d)4x+3y=18

(iii)What can be concluded if both the equations are plotted on graph?(write also reason)
(a)the lines are coinciding
(b)the lines are parallel
(c) the lines are perpendicular
(d)the lines are intersecting