

GREEN GARDEN MATRIC.HR.SEC.SCHOOL, PERUNDURAI R.S
MODEL QUESTION PAPER - I

Std : X

Marks : 100

MATHEMATICS

Time : 3.00Hrs.

PART – I

Note : (i) Answer all the questions.

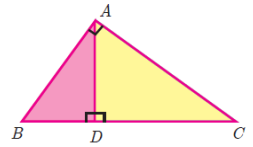
(ii) Choose the correct answer in each question. Each of these questions contains four options with just one correct option.

14x 1 = 14

1. The range of the relation $R = \{(x, x^2) | x \text{ is a prime number less than } 13\}$ is
 - a) $\{2, 3, 5, 7\}$
 - b) $\{2, 3, 5, 7, 11\}$
 - c) $\{4, 9, 25, 49, 121\}$
 - d) $\{1, 4, 9, 25, 49, 121\}$
2. Let $f(x) = \sqrt{1+x^2}$ then
 - a) $f(xy) = f(x) \cdot f(y)$
 - b) $f(xy) \geq f(x) \cdot f(y)$
 - c) $f(xy) \leq f(x) \cdot f(y)$
 - d) None of these
3. In an A.P., the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?
 - a) 6
 - b) 7
 - c) 8
 - d) 9
4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
 - a) $\frac{1}{24}$
 - b) $\frac{1}{27}$
 - c) $\frac{2}{3}$
 - d) $\frac{1}{81}$
5. The solution of $(2x-1)^2 = 9$ is equal to
 - a) -1
 - b) 2
 - c) -1, 2
 - d) None of these
6. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{pmatrix}$ and $C = \begin{pmatrix} 0 & 1 \\ -2 & 5 \end{pmatrix}$. Which of the following statements are correct?
 - i) $AB + C = \begin{pmatrix} 5 & 5 \\ 5 & 5 \end{pmatrix}$
 - ii) $BC = \begin{pmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{pmatrix}$
 - iii) $BA + C = \begin{pmatrix} 2 & 5 \\ 3 & 0 \end{pmatrix}$
 - iv) $(AB)C = \begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$
 - a) (i) and (ii) only
 - b) (ii) and (iii) only
 - c) (iii) and (iv) only
 - d) All Of these

7. In a $\triangle ABC$, AD is the bisector of $\angle BAC$. If $AB = 8\text{ cm}$, $BD = 6\text{ cm}$ and $DC = 3\text{ cm}$. The length of the side AC is

- a) 6 cm
b) 4 cm
c) 3 cm
d) 8 cm



8. A tangent is perpendicular to the radius at the

- a) Centre
b) Point of contact
c) Infinity
d) Chord

9. A straight line has equation $8y = 4x + 21$. Which of the following is true?

- a) The slope is 0.5 and the Y-intercept is 2.6
b) The slope is 5 and the Y-intercept is 1.6
c) The slope is 0.5 and the Y-intercept is 1.6
d) The slope is 5 and the Y-intercept is 2.6

10. If $x = a \tan \theta$ and $y = b \sec \theta$ then

- a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$
b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$

11. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is

- a) 1:2
b) 1:4
c) 1:6
d) 1:8

12. If the radius of the base of a cone is tripled and the height is doubled then the volume is

- a) made 6 times
b) made 18 times
c) made 12 times
d) unchanged

13. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then

the value of x is

- a) 2
b) 1
c) 3
d) 1.5

14. A purse contains 10 notes of ₹2000, 15 notes of ₹500, and 25 notes of ₹200. One note is drawn at random. What is the probability that the note is either a ₹500 note or ₹200 note?

- a) $\frac{1}{5}$
b) $\frac{3}{10}$
c) $\frac{2}{3}$
d) $\frac{4}{5}$

PART - II

Note : (i) Answer 10 questions.

(ii) Question No.28 is compulsory.

10 x 2 = 20

15. Let $A = \{1, 2, 3, 4, \dots, 45\}$ and R be the relation defined as "is square of a number" on A . Write R as a subset of $A \times A$. Also, find the domain and range of R .
16. If $A = \{-2, -1, 0, 1, 2\}$ and $f : A \rightarrow B$ is an onto function defined by $f(x) = x^2 + x + 1$ then find B .
17. What is the time 100 hours after 7 a.m.?
18. Find the 19th term of an A.P. -11, -15, -19,
19. Find the sum to infinity of $9 + 3 + 1 + \dots$
20. Find the excluded values of the following expression $\frac{7p+2}{8p^2+13p+5}$.
21. Determine the nature of roots for the quadratic equation $9x^2 - 24x + 16 = 0$.
22. If $\triangle ABC$ is similar to $\triangle DEF$ such that $BC = 3$ cm, $EF = 4$ cm and area of $\triangle ABC = 54$ cm². Find the area of $\triangle DEF$
23. Calculate the slope and y intercept of the straight line $8x - 7y + 6 = 0$.
24. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$.
25. If the ratio of radii of two spheres is 4:7, find the ratio of their volumes.
26. The ratio of the radii of two right circular cones of same height is 1:3. Find the ratio of their curved surface area when the height of each cone is 3 times the radius of the smaller cone.
27. If $n = 5, \bar{x} = 6, \sum x^2 = 765$ then calculate the coefficient of variation.
28. From the top of a rock $50\sqrt{3}$ m high, the angle of depression of a car on the ground is observed to be 30° . Find the distance of the car from the rock.

PART - III

Note : (i) Answer 10 questions.

(ii) Question No.42 is compulsory.

10 x 5 = 50

29. A function $f : [-5, 9] \rightarrow R$ is defined as follows: $f(x) = \begin{cases} 6x+1 & -5 \leq x < 2 \\ 5x^2-1 & 2 \leq x < 6 \\ 3x-4 & 6 \leq x \leq 9 \end{cases}$ find

i) $f(-3) + f(2)$

ii) $f(7) - f(1)$

ii) $2f(4) + f(8)$

iv) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

30. Let $A = \{3, 4, 7, 8\}$, $B = \{1, 7, 10\}$ which of the following sets are relations from A to B?

i) $R_1 = \{(3, 7), (4, 7), (7, 10), (8, 11)\}$

ii) $R_2 = \{(3, 1), (4, 12)\}$

iii) $R_3 = \{(3, 7), (4, 10), (7, 7), (7, 8), (8, 11), (8, 7), (8, 10)\}$

31. Find the sum to n terms of the series $5 + 55 + 555 + \dots$

32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ..., 24 cm. How much area can be decorated with these colour papers?

33. From a group of $2x^2$ black bees, square root of half of the group went to a tree. Again eight-ninth of the bees went to the same tree. The remaining two got caught up in a fragrant lotus. How many bees were there in total?

34. Find the values of m and n if the following polynomials are perfect squares

$$36x^4 - 60x^3 + 61x^2 - mx + n$$

35. The roots of the equation $x^2 + 6x - 4 = 0$ are α, β . Find the quadratic equation whose roots are

i) α^2 and β^2

ii) $\frac{2}{\alpha}$ and $\frac{2}{\beta}$

iii) $\alpha^2\beta$ and $\beta^2\alpha$

36. State and prove: Angle Bisector Theorem.

37. Find the equation of the perpendicular bisector of the line joining the points A (- 4, 2) and B(6, - 4) .

38. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}} m$.

39. Seenu's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (underground tank) which is in the shape of a cuboid. The sump has dimensions $2m \times 1.5m \times 1m$. The overhead tank has its radius of 60 cm and height 105 cm. Find the volume of the water left in the sump after the overhead tank has been completely filled with water from the sump which has been full, initially.

40. For a group of 100 candidates the mean and standard deviation of their marks were found to be 60 and 15 respectively. Later on it was found that the scores 45 and 72 were wrongly entered as 40 and 27 Find the correct mean and standard deviation.

41. Two unbiased dice are rolled once. Find the probability of getting

(i) A doublet (equal numbers on both dice)

(ii) The product as a prime number

(iii) The sum as a prime number

(iv) The sum as 1

42. Prove analytically that the line segment joining the mid-points of two sides of a triangle is parallel to the third side and is equal to half of its length.

PART - IV

Note : Answer the following

2 x 8 = 16

43. **a)** Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

(or)

- b)** Construct a ΔPQR in which $QR = 6.5$ cm, $\angle P = 60^\circ$ and the altitude from P to QR of length is 4.5 cm.

44. **a)** Draw the graph of $y = (x-1)(x+3)$ and hence solve $x^2 - x - 6 = 0$.

(or)

- b)** Draw the graph of $xy = 24, x, y > 0$ Using the graph find, (i) y when $x = 3$ and (ii) x when $y = 6$.

1.	2.	3.	4.	5.	6.	7.
c	c	c	b	c	a	b
8.	9.	10.	11.	12.	13.	14.
b	a	a	b	b	b	a

GREEN GARDEN MATRIC.HR.SEC.SCHOOL, PERUNDURAI R.S

MODEL QUESTION PAPER - II

Std : X

Marks : 100

MATHEMATICS

Time : 3.00Hrs.

PART – I

Note : (i) Answer all the questions.

(ii) Choose the correct answer in each question. Each of these questions contains four options with just one correct option.

$$14 \times 1 = 14$$

1. If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B , then the number of elements in B is

- a) 3 b) 2
c) 4 d) 8

2. If $f: A \rightarrow B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to

- [illegible]

3. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is

- a) 4 b) 2
c) 1 d) 3

4. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \dots + 2^0$ which of the following is true?

- a) B is 2^{64} more than A
b) A and B are equal
c) B is larger than A by 1
d) A is larger than B by 1

5. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

- a) $\frac{9y}{7}$

- $$\text{b) } \frac{9y^3}{(21y-21)}$$

- c) $\frac{21y^2 - 42y + 21}{3y^3}$

- $$\text{d) } \frac{7(y^2 - 2y) + 1}{y^2}$$

6. If $A = \begin{pmatrix} 1 & -2 \\ -3 & 4 \end{pmatrix}$ and $A + B = O$, then B is

- a) $\begin{pmatrix} 1 & -2 \\ -3 & 4 \end{pmatrix}$

- $$\text{b) } \begin{pmatrix} -1 & 2 \\ 3 & -4 \end{pmatrix}$$

- c) $\begin{pmatrix} -1 & -2 \\ -3 & -4 \end{pmatrix}$

- $$\text{d) } \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

7. Transpose of a column matrix is
- unit matrix
 - diagonal matrix
 - column matrix
 - row matrix
8. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
- 13 m
 - 14 m
 - 15 m
 - 12.8 m
9. The straight line given by the equation $x = 11$ is
- Parallel to X -axis
 - Parallel to Y -axis
 - Passing through the origin
 - Passing through the point (0,11)
10. The slope of the line joining (12, 3), (4, a) is $\frac{1}{8}$. The value of 'a' is
- 1
 - 4
 - 5
 - 2
11. If the ratio of the height of tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure
- 45°
 - 30°
 - 90°
 - 60°
12. $1 - \frac{\sin^2 \theta}{1 + \cos \theta} =$
- $\cos \theta$
 - $\tan \theta$
 - $\cot \theta$
 - $\operatorname{cosec} \theta$
13. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is
- 1:2:3
 - 2:1:3
 - 1:3:2
 - 3:1:2
14. Which of the following is incorrect?
- $P(A) > 1$
 - $0 \leq P(A) \leq 1$
 - $P(\phi) = 0$
 - $P(A) + P(\bar{A}) = 1$

PART - II

Note : (i) Answer 10 questions.

(ii) **Question No.28 is compulsory.**

10 x 2 = 20

15. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$, then find A and B.
16. Let $f(x) = x^2 - 1$. Find **i)** $f \circ f$ **ii)** $f \circ f \circ f$

17. Find the middle term(s) of an A.P 9, 15, 21, 27, ..., 183.

18. If $A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}, B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$ find the value of **i)** $B - 5A$ **ii)** $3A - 9B$

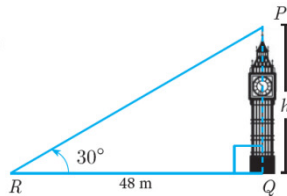
19. Simplify : $\frac{x(x+1)}{x-2} + \frac{x(1-x)}{x-2}$

20. If radii of two concentric circles are 4 cm and 5 cm then find the length of the chord of one circle which is a tangent to the other circle.

21. If the area of the triangle formed by the vertices A(0, 0), B(p, 8) and C(6, 2) (taken in order) is 20 sq.units . Find the value of 'p'.

22. Prove that $\tan^2 A - \tan^2 B = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

23. A tower stands vertically on the ground. From a point on the ground, which is 48 m away from the foot of the tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower.



24. If the total surface area of a cone of radius 7cm is 704 cm^2 , then find its slant height.

25. If the circumference of a conical wooden piece is 484 cm then find its volume when its height is 105 cm.

26. Find the standard deviation of first 21 natural numbers.

27. If $P(A) = \frac{2}{3}, P(B) = \frac{2}{5}, P(A \cup B) = \frac{1}{3}$ then find $P(A \cap B)$.

28. Total surface area of a solid hemisphere is 675π sq.cm. Find the curved surface area of the solid hemisphere.

PART - III

Note : (i) Answer 10 questions.

(ii) Question No.42 is compulsory. .

10 x 5 = 50

29. If the function $f: \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = \begin{cases} 2x+7; & x < -2 \\ x^2-2; & -2 \leq x < 3 \\ 3x-2; & x \geq 3 \end{cases}$, then find the values of

i) $f(4)$

ii) $f(-2)$

iii) $f(4) + 2f(1)$

iv) $\frac{f(1)-3f(4)}{f(-3)}$

30. If $f(x) = x-1, g(x) = 3x+1$ and $h(x) = x^2$ then Show that $(f \circ g) \circ h = f \circ (g \circ h)$

31. Find the sum to n terms of the series $0.4 + 0.44 + 0.444 \dots$ to n terms

32. Vani, her father and her grandfather have an average age of 53. One-half of her grandfather's age plus one-third of her father's age plus one fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now?

33. Simplify: $\frac{1}{x^2 - 5x + 6} + \frac{1}{x^2 - 3x + 2} - \frac{1}{x^2 - 8x + 15}$

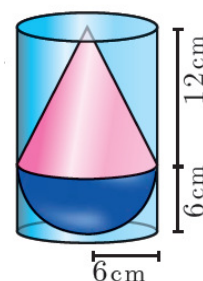
34. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ show that $A^2 - (a + d)A = (bc - ad)I_2$

35. State and prove Angle Bisector theorem.

36. Find the area of the quadrilateral whose vertices are at $(-9, -2)$, $(-8, -4)$, $(2, 2)$ and $(1, -3)$.

37. Find the equation of a straight line joining the point of intersection of $3x + y + 2 = 0$ and $x - 2y - 4 = 0$ to the point of intersection of $7x - 3y = -12$ and $2y = x + 3$

38. An aeroplane at an altitude of 1800 m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats. ($\sqrt{3} = 1.732$)



39. A solid consisting of a right circular cone of height 12 cm and radius 6 cm standing on a hemisphere of radius 6 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of the water displaced out of the cylinder, if the radius of the cylinder is 6 cm and height is 18 cm.

40. In a study about viral fever, the number of people affected in a town were noted as Find its standard deviation.

Age of years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that

(i) The student opted for NCC but not NSS.

(ii) The student opted for NSS but not NCC.

(iii) The student opted for exactly one of them.

42. Prove that the equation $x^2(p^2 + q^2) + 2x(pr + qs) + r^2 + s^2 = 0$ has no real roots. If $ps = qr$, then show that the roots are real and equal.

PART - IV

Note : Answer the following

2 x 8 = 16

43. **a)** Draw a tangent to the circle from the point P having radius 3.6 cm, and centre at O.

Point P is at a distance 7.2 cm from the centre.

(or)

- b)** Construct a ΔPQR in which $PQ = 8$ cm, $\angle R = 60^\circ$ and the median RG from R to PQ is 5.8 cm.

Find the length of the altitude from R to PQ .

44. **a)** The following table shows the data about the number of pipes and the time taken to fill the same tank.

No. of pipes (x)	2	3	6	9
Time Taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence

(i) find the time taken to fill the tank when five pipes are used

(ii) Find the number of pipes when the time is 9 minutes.

- b)** Draw the graph of $y = x^2 - 4x + 3$ and use it to solve $x^2 - 6x + 9 = 0$

1.	2.	3.	4.	5.	6.	7.
b	a	b	d	a	b	d
8.	9.	10.	11.	12.	13.	14.
a	b	d	d	a	d	a

MODEL QUESTION PAPER - III

Std : X

Marks : 100

MATHEMATICS

Time : 3.00Hrs.

PART – I

Note : (i) Answer all the questions.

(ii) Choose the correct answer in each question. Each of these questions contains four options with just one correct option.

14x 1 = 14

1. If $\{(a, 8), (6, b)\}$ represents an identity function, then the value of a and b are respectively
 - a) (8, 6)
 - b) (8, 8)
 - c) (6, 8)
 - d) (6, 6)
2. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
 - a) linear
 - b) cubic
 - c) reciprocal
 - d) quadratic
3. Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
 - a) 3
 - b) 5
 - c) 8
 - d) 11
4. The value of $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$ is
 - a) 14400
 - b) 14200
 - c) 14280
 - d) 14520
5. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$, are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in ____
 - a) A.P
 - b) G.P
 - c) Both A.P and G.P
 - d) None of these
6. Which of the following can be calculated from the given matrices
$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix},$$
 - i) A^2
 - ii) B^2
 - iii) AB
 - iv) BA
 - a) (i) and (ii) only
 - b) (ii) and (iii) only
 - c) (ii) and (iv) only
 - d) all of these

- a) $6\frac{2}{3}cm$ b) $\frac{10\sqrt{6}}{3}cm$
c) $66\frac{2}{3}cm$ d) 15 cm

- a) 6 cm b) 5 cm
c) 8 cm d) 4 cm

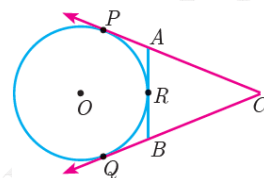
- a) l_1 and l_2 are perpendicular
b) l_1 and l_4 are parallel
c) l_2 and l_4 are perpendicular
d) l_2 and l_3 are parallel

- a) $\sqrt{2}x$
b) $\frac{x}{2\sqrt{2}}$
c) $\frac{x}{\sqrt{2}}$
d) $2x$

- a) $\frac{9\pi h^2}{8} sq. units$ b) $24\pi h^2 sq. units$
c) $\frac{8\pi h^2}{9} sq. units$ d) $\frac{56\pi h^2}{9} sq. units$

- a) a cylinder and a sphere
b) a hemisphere and a cone
c) a sphere and a cone
d) frustum of a cone and a hemisphere

- a) $\frac{q}{p+q+r}$ b) $\frac{p}{p+q+r}$
- c) $\frac{p+q}{p+q+r}$ d) $\frac{p+r}{p+q+r}$



PART - III

Note : (i) Answer 10 questions.

(ii) Question No.42 is compulsory. .

10 x 5 = 50

29. Let $A = \{x \in N \mid 1 < x < 4\}$, $B = \{x \in W \mid 0 \leq x < 2\}$ and $C = \{x \in N \mid x < 3\}$ Then verify that

i) $A \times (B \cup C) = (A \times B) \cup (A \times C)$

ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$

30. Let $f : A \rightarrow B$ be a function defined by $f(x) = \frac{x}{2} - 1$, Where $A = \{2, 4, 6, 10, 12\}$,

$B = \{0, 1, 2, 4, 5, 6\}$. Represent f by

i) set of ordered pairs

ii) a table

iii) an arrow diagram

iv) a graph

31. If nine times ninth term is equal to the fifteen times fifteenth term, show that six times twenty fourth term is zero.

32. In a G.P. the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is $\frac{57}{2}$. Find the three terms.

33. The sum of the digits of a three-digit number is 11. If the digits are reversed, the new number is 46 more than five times the former number. If the hundreds digit plus twice the tens digit is equal to the units digit, then find the original three digit number ?

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

35. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ show that $A^2 - (a + d)A = (bc - ad)I_2$

36. State and prove: Pythagoras Theorem

37. A quadrilateral has vertices at A(- 4,- 2) , B(5,- 1) , C(6,5) and D(- 7,6) . Show that the mid-points of its sides form a parallelogram.

38. If $\sin \theta (1 + \sin^2 \theta) = \cos^2 \theta$, then prove that $\cos^6 \theta - 4\cos^4 \theta + 8\cos^2 \theta = 4$.

39. A container open at the top is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of milk which can completely fill a container at the rate of ₹40 per litre.

40. The time taken (in minutes) to complete a homework by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the coefficient of variation.

41. Two dice are rolled. Find the probability that the sum of outcomes is

(i) equal to 4

(ii) greater than 10

(iii) less than 13

42. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through (-3, 8) . Find its equation.

PART - IV

Note : Answer the following

2 x 8 = 16

43. **a)** Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3} > 1$).

(or)

- b)** Construct a ΔPQR in which $PQ = 8$ cm, $\angle R = 60^\circ$ and the median RG from R to PQ is 5.8 cm.

Find the length of the altitude from R to PQ .

44. **a)** Graph the $(2x - 3)(x + 2) = 0$ quadratic equations and state their nature of solutions.

(or)

- b)** Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of 12 km/hr and reached the destination in 1 hour. He was followed by Aradhana, Jeyanth, Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3 km/hr and 2 km/hr. And, they covered the distance in 2 hrs, 3 hrs, 4 hrs and 6 hours respectively. Draw the speed-time graph and use it to find the time taken to Kaushik with his speed of 2.4 km/hr.

1.	2.	3.	4.	5.	6.	7.
a	d	d	c	b	c	d
8.	9.	10.	11.	12.	13.	14.
d	c	b	c	d	b	c