MODEL TEST PAPER-1

Time Allowed : 3 Hours   **Max. Marks : 80**

General Instructions :
(i) **All** questions are compulsory.
(ii) This question paper consists of **40** questions divided into four sections—A, B, C and D.
(iii) **Section A** contains **20** questions of **1 mark** each. **Section B** contains **6** questions of **2 marks** each. **Section C** contains **8** questions of **3 marks** each. **Section D** contains **6** questions of **4 marks** each.
(iv) There is no overall choice. However, an internal choice has been provided in four questions of **3 marks** each and three questions of **4 marks** each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculator is **not** permitted.

Section A

Question number 1 to 20 carry 1 mark each.

Q. 1. If $2^4 \times 4^2 = 16^x$, then value of x is :
(a) 2   (b) 3   (c) 4   (d) 6

Q. 2. The number which is the only even prime number is :
(a) 2   (b) 4   (c) 6   (d) 1

Q. 3. Value of $(6^2 + 8^2)^{1/2}$ is equal to :
(a) 100   (b) 10   (c) 5   (d) 1

Q. 4. If $x - \dfrac{1}{x} = -1$, then value of $x + \dfrac{1}{x}$ is equal to :
(a) 3   (b) 4   (c) 5   (d) 6

Q. 5. If $x - a$ is a factor of $x^3 - a^2x + x + 2$, then value of a is equal to :
(a) 0   (b) 4   (c) –3   (d) –2

Q. 6. The point where the line $3x + y = 2$ meets the x-axis is :
(a) $\left(\dfrac{1}{2}, 0\right)$ (b) $\left(\dfrac{-5}{2}, 0\right)$ (c) $\left(\dfrac{2}{3}, 0\right)$ (d) $\left(\dfrac{6}{7}, 0\right)$

Q. 7. Fill in the blank in the following statement :
The graph of $x = k$ is a straight line parallel to _____ axis.

Q. 8. State True of False :
One of the solutions of the equation $3x + 2y = 5$ is $x = 1, y = 1$.

Q. 9. Which of the following points lies in third quadrant ?
(a) (0, 1)   (b) (1, –2)   (c) (–1, –2)   (d) (0, 6)

Q. 10. Fill in the blank in the following statement :
Ordinate of the point (6, 3) is _____ .

Q. 11. State true or false :
Heron's formula cannot be used for calculating the area of triangle if it is isosceles.

Q. 12. In figure, if $\angle$ AOC and $\angle$ BOC form a linear pair, then find the value of x.
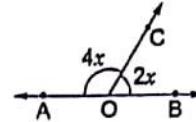
**Q. 13.** In the given figure, if $l \parallel m$, then find the value of x.
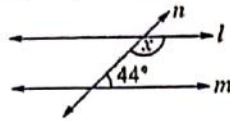
Q. 14. In triangles ABC and DEF, AB = DE and $\angle$B = $\angle$E. Write the condition for the two triangles to be congruent by SAS congruence condition.

Q. 15. If the vertical angle of an isosceles triangle is 70°, then the base angles are :
(a) 55°　　　　(b) 65°　　　　(c) 70°　　　　(d) 75°

Q. 16. Three angles of a quadrilateral are 75°, 90° and 75°. Fourth angle is equal to :
(a) 60°　　　　(b) 80°　　　　(c) 100°　　　　(d) 120°

Q. 17. Points M and N are the mid-points of sides PQ and PR respectively of a $\triangle$PQR. If the length of line segment, MN = 9 cm, then find length of side QR.

Q. 18. Degree of the polynomial $2x^5 + 4x^4 - 6x^3 + 10x^2 + 5x + 10$ is :
(a) 2　　　　(b) 3　　　　(c) 5　　　　(d) 6

Q. 19. If $x = 2$ is the zero of the polynomial $2x^2 - 3x + 7k$, find the value of k.

Q. 20. Simplify : $175 \times 175 + 2 \times 175 \times 25 + 25 \times 25$.

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Find the value of $x^3 + y^3 - 12xy + 64$, when $x + y = -4$.

Q. 22. There is a triangular garden, whose vertices are given by the points P(0, 1), Q(0, 5) and R(3, 4). Find the area of the garden.

Q. 23. In the given figure, AB $\parallel$ DC and AD $\parallel$ BC.
Prove that $\angle$ DAB = $\angle$ DCB.
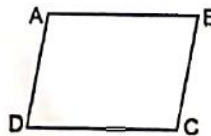
Q. 24. Convert $23.\overline{43}$ in the form $\dfrac{p}{q}$.

Q. 25. On which axis do the given points lie ?
(a) (0, 8)　　　　(b) (7, 0)　　　　(c) (0, −5)　　　　(d) (−8, 0)

Q. 26. If two lines intersect, prove that the vertically opposite angles are equal.
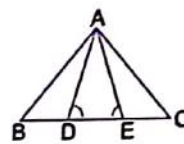
Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Using factor theorem, factorise the cubic polynomial $x^3 - 6x^2 + 11x - 6$.
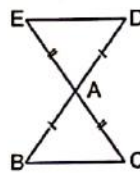
Or

If $x = -2$ and $y = 1$, by using an identity, find the value of $\left(5y + \dfrac{15}{y}\right)\left(25y^2 - 75 + \dfrac{225}{y^2}\right)$.

Q. 28. In given figure, D and E are points on the base BC of $\triangle$ ABC such that BD = CE, AD = AE and $\angle$ADE = $\angle$AED. Prove that $\triangle$ ABE $\cong$ $\triangle$ ACD.

Or

In the given figure, sides BA, CA have been produced to D and E respectively such that BA = AD and CA = AE. Prove that DE ∥ BC.

Q. 29. The perimeter of a triangular field is 450 m and its sides are in the ratio 13 : 12 : 5. Find the area of triangle.

Or

An isosceles triangle, has perimeter 30 cm and each equal sides is 12 cm. Find the area of triangle.

Q. 30. 1500 families with 2 children were selected randomly, and the following data were recorded :

Number of girls in a family	2	1	0
Number of families	470	818	212

Compute the probability of a family, chosen at random having :

(I) 1 girl   (ii) 2 girls   (iii) no girl

Q. 31. Express each of the following recurring decimals in the form $\dfrac{p}{q}$:

(I) $0.13\overline{54}$ (ii) $7.5\overline{792}$

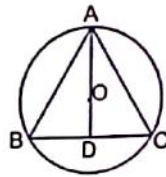**Q. 32.** If the mean of the following data is 6, find the value of p.

x	2	4	6	10	$p + 5$
f	3	2	3	1	2

Or

If the mean of the following data is 25, find the value of k.

x	5	15	25	35	45
f	3	k	3	6	2

Q. 33. Bisector AD of ∠ BAC of Δ ABC passes through the centre O of the circumcircle of Δ ABC as in given figure, prove that AB = AC.
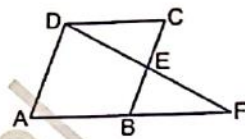
Q. 34. The ratio of the radii of the bases of two right circular cylinders of same height is 2 : 5. Find the ratio of their volumes.

Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. In the adjoining figure, ABCD is a parallelogram and E is the mid-point of side BC. If DE and AB when produced meet at F, then prove that AF = 2AB.

Or

Prove that the angle bisectors of a parallelogram form a rectangle.

Q. 36. If the polynomials $kx^3 + 3x^2 - 13$ and $2x^3 - 5x + k$, when divided by $(x - 2)$ leave the same remainder, find the value of k.

Or

If remainder is same when the polynomials $ax^3 + 3x^2 - 13$ and $2x^3 - 5x + a$ are divided by $(x + 2)$, find the value of a.

Q. 37. D, E and F are respectively the mid-points of the sides BC, CA and AB of a Δ ABC. Show that

(i) BDEF is a parallelogram   (ii) $ar (\Delta DEF) = \dfrac{1}{4} ar (\Delta ABC)$
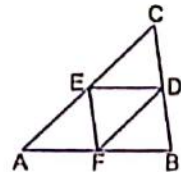
Q. 38. The length of a room is 1.5 times its breadth. The cost of carpeting the floor of the room at ₹ 3.25 per m² is ₹ 175.50 and the cost of papering the walls at ₹ 1.40 per m² is ₹ 240.80. If 1 door and 2 windows occupy 8 m², find the dimensions of the room.

Or

A cuboidal oil tin is 30 cm by 40 cm by 50 cm. Find the cost of the tin required for making 20 such tins if the cost of tin sheet is ₹ 20 per square metre.

**Q. 39.** Construct a triangle whose perimeter is 9 cm and the base angles are 30° and 45°.

Q. 40. In a study of certain diseases, the following data were obtained.

Age at first detection (in years)	Number of patients
4—8	2
8—12	12
12—16	15
16—20	25
20—24	18
24—28	12
28—32	3
32—36	1

Represent the data in the form of histogram.

ANSWERS

1. (a) 2   **2.** (a) 2   **3.** (b) 10   **4.** (c) 5   **5.** (d) –2   **6.** (c) $\left(\dfrac{2}{3}, 0\right)$ **7.** y

8. True   **9.** (c) (–1, –2)   **10.** 3   **11.** False   **12.** 30°   **13.** 136°

14. BC = EF   **15.** (a) 55°   **16.** (d) 120°   **17.** 18 cm   **18.** (c) 5   **19.** $\dfrac{-2}{7}$ **20.** 4,0000

21. 0   **22.** 6 sq. units   **24.** $\dfrac{2320}{99}$ **25.** (i) y-axis   (ii) x-axis   (iii) y-axis   (iv) x-axis

27. $(x-1)(x-2)(x-3)$ Or 3500   **29.** 6750 m² Or $9\sqrt{5}$ cm²   **30.** (i) 0.545 (ii) 0.313 (iii) 0.141

31. (i) $\dfrac{149}{1100}$ (ii) $\dfrac{8413}{1110}$ **32.** $p = 7$ Or $k = 4$ **34.** 4 : 25   **36.** $k = 1$ or $a = \dfrac{5}{9}$

38. $l = 9$ m, $b = 6$ m and $h = 6$ m Or ₹ 376   **39.**

40.
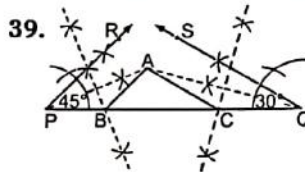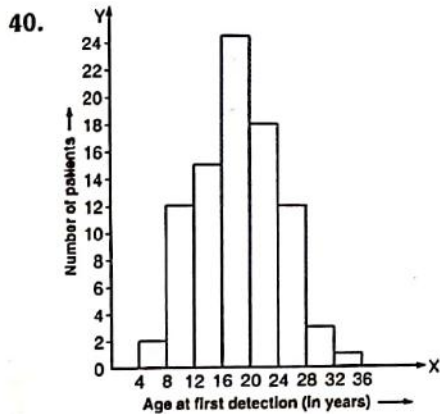
MODEL TEST PAPER-2

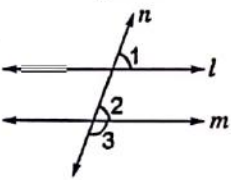**Time Allowed : 3 Hours**   **Max. Marks : 80**

General Instructions : Same as Model Test Paper-1

Section A

Question number 1 to 20 carry 1 mark each.

Q. 1. $(0.008)^{2/3}$ is equal to :

(a) 0.004   (b) 0.04   (c) 0.4   (d) 0.0004

Q. 2. $\dfrac{6^{1/2}}{5^{1/2}}$ is equivalent to :

(a) $\left(\dfrac{6}{5}\right)^{1/2}$ (b) $\dfrac{6}{\sqrt{5}}$ (c) $\dfrac{6^{1/2}}{5}$ (d) $6^{1/2} - 5^{1/2}$

**Q. 3.** Decimal representation of $\frac{3}{4}$ is :

(a) 0.45　　　　(b) 0.55　　　　(c) 0.65　　　　(d) 0.75

Q. 4. If $a + b + c = 6$, $ab + bc + ca = 8$ and $abc = -5$, then value of $a^3 + b^3 + c^3$ is equal to :

(a) 29　　　　(b) 62　　　　(c) 57　　　　(d) 59

Q. 5. When $4x^4 - 3x^3 - 2x^2 + x - 7$ is divided by $x + 1$, then the remainder is :

(a) -3　　　　(b) 2　　　　(c) -4　　　　(d) -6

Q. 6. Quadrant in which the point $(-2, -4)$ lies, is :

(a) first　　　　(b) second　　　　(c) third　　　　(d) fourth

Q. 7. Fill in the blank in the following statement :

$x = $ _____ is the solution of the linear equation $4x - 3 = 0$.

Q. 8. State true or false :

-3 and -9 are zeroes of the polynomial $x^2 + 9$.

Q. 9. If $3x - 21$ is a factor of $2x^2 + k$, then find the value of k.

Q. 10. Fill in the blank in the following statement :

Abscissa of the point $(0, 2)$ is _____ .

Q. 11. State True of False :

Area of triangle having sides 9 cm, 10 cm and 11 cm is 42.4 cm^2

Q. 12. Write the degree measure of an angle, which is equal to its complement ?

Q. 13. In the given figure, lines $l \parallel m$ and n is any transversal.
If $\angle 1 = 70°$, find the measures of $\angle 2$ and $\angle 3$.

Q. 14. Write True or False :

Two triangles are congruent, if two angles and the included side of one triangle are equal to the corresponding two angles and the included side of the other triangle.

Q. 15. In $\triangle ABC$, if $AB = AC$ and $\angle A = 80°$, find $\angle C$.

Q. 16. A quadrilateral having exactly one pair of parallel sides is called a :

(a) square　　　　(b) trapezium　　　　(c) rhombus　　　　(d) rectangle

Q. 17. Write True or False :

Length of line segment joining the mid-points of any two sides of a triangle is equal to one-third of the length of third side.

Q. 18. Sum of coefficients of x^2 and x^3 in the polynomial $2x^3 + 4x^2 - 8x + 9$ is equal to :

(a) 2　　　　(b) 4　　　　(c) 6　　　　(d) 7

Q. 19. If $64a^2 - b = \left(8a + \frac{1}{2}\right)\left(8a - \frac{1}{2}\right)$, then value of b is :

(a) $\frac{1}{4}$　　　　(b) $\frac{1}{2}$　　　　(c) 0　　　　(d) 1

Q. 20. Value of $\dfrac{5 \times 5 \times 5 + 3 \times 3 \times 3}{5 \times 5 - 5 \times 3 + 3 \times 3}$ is equal to :

(a) 14   (b) 12   (c) 10   (d) 8

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Simplify the following by rationalising denominator $\dfrac{6}{3\sqrt{2} - 2\sqrt{3}}$:

Q. 22. Name the quadrant on which the following points lie

(i) $(2, -3)$ (ii) $(3, -2)$ (iii) $(-2, -3)$ (iv) $(-2, 3)$

Q. 23. Two circles intersect each other at points A and B. If AP and AQ are the respective diameters of the two circles, prove that PBQ is a line.

Q. 24. Find the area of a rhombus, whose perimeter is 80 m and one of whose diagonal is 24 m.

Q. 25. Shabana has plotted four points (x, y) such that $y = 2x + 1$ and then joined them to form the graph. What type of graph she got ?

Q. 26. In figure, if $\angle 2 = 120°$ and $\angle 5 = 60°$, show that $m \parallel n$.
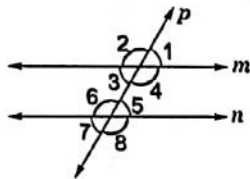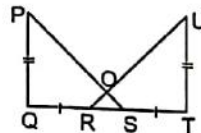

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Find the three rational numbers between $\dfrac{3}{8}$ and $\dfrac{5}{8}$.

Q. 28. Factorise : $125x^3 - 27y^3 - 225x^2y + 135xy^2$.

Or

If $x^4 + \dfrac{1}{x^4} = 119$, find the value of $x^3 - \dfrac{1}{x^3}$.

Q. 29. In given figure, PQ = UT, QR = ST, PQ $\perp$ QS and UT $\perp$ RT.
Prove that $\triangle$ PQS $\cong$ $\triangle$ UTR.

Or

If the bisector of the exterior vertical angle of a triangle is parallel to the base, show that the triangle is isosceles.

Q. 30. A wall of length 20 m was to be built across an open ground. The height of the wall is 9 m and the thickness of the wall is 24 cm. If this wall is to be built up with bricks whose dimensions are 18 cm × 10 cm × 6 cm, how many bricks would be required ?

Or

Find the ratio between the total surface area of a cylinder to its curved surface area, given that its height and radius are 7.5 cm and 3.5 cm.

Q. 31. In a cricket match, a batsman Sachin played 40 balls. The runs scored are given in the table. Find the probability that Sachin will score

(i) 4 runs　　　(ii) 1 or 2 runs　　(iii) 2 or 3 or 4 runs

Runs scored	0	1	2	3	4	5
Number of balls	13	15	5	1	4	2

Q. 32. ABCD is a cyclic quadrilateral with AD ∥ BC. Prove that, AB = CD.
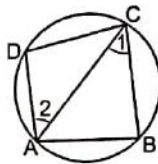
Q. 33. The class-marks of a frequency distribution are 47, 52, 57, 62, 67, 72, 77, 82, 87, 92, 97, 102. Determine the class-size and class-limits.

Or

If the mean of the following distribution is 6, find the value of p.

x	2	4	6	10	p
f	2	4	2	1	2

Q. 34. Three solid spheres of iron whose diameters are 2 cm, 12 cm and 16 cm respectively, are melted into a single solid sphere. Find the radius of the solid sphere.

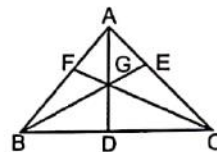## Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. In a parallelogram ABCD, E is the mid-point of AD. Show that $ar(\triangle ABE) = \frac{1}{4} \times ar$ ($∥^{gm}$ ABCD)

Or

If the medians of a $\triangle$ ABC intersect at G, show that
$ar(\triangle AGB) = ar(\triangle AGC)$
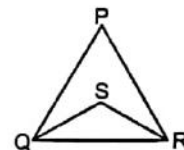$= ar (\triangle BGC) = \frac{1}{3} ar (\triangle ABC).$

Q. 36. If the polynomials $2x^3 + ax^2 + 3x - 5$ and $x^3 + x^2 - 4x + a$ have the same remainder when divided by $(x - 2)$, find the value of a.

Or

Using factor theorem, factorise the polynomial $x^3 - 7x^2 + 14x - 8$.

Q. 37. In the given figure, PQR is a triangle and S is any point in its interior. Show that SQ + SR < PQ + PR.

Q. 38. A cloth having an area of 165 m² is shaped into a conical tent of radius 5 m.

(I) How many students can sit in the tent, if a student occupies $\frac{5}{7}$ m² on the ground ?
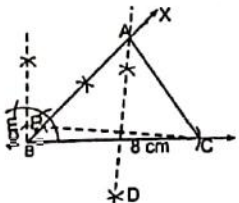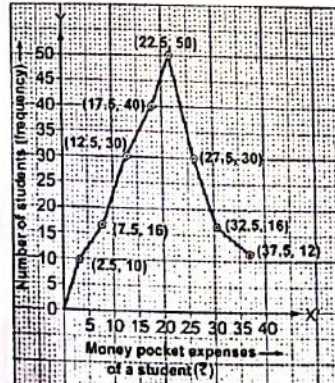
(II) Find the volume of air for each student.

Or

When a sphere of radius 5 cm is immersed in water filled in a cylinder, the level of water rises by $\frac{5}{3}$ cm. Find the radius of the cylinder.

Q. 39. Construct a triangle ABC in which BC = 8 cm, ∠ B = 45° and AB – AC = 1 cm.

Q. 40. Construct a frequency polygon for the following data :

Money pocket expenses of a student (In ₹)	Number of students
0—5	10
5—10	16
10—15	30
15—20	40
20—25	50
25—30	30
30—35	16
35—40	12

【ANSWERS】

1. (b) 0.04   **2.** (a) $\left(\frac{6}{5}\right)^{1/2}$ **3.** (d) 0.75   **4.** (c) 57   **5.** (a) –3   **6.** (c) third   **7.** $\frac{3}{4}$

8. False   **9.** k = –98   **10.** 0   **11.** True   **12.** 45°   **13.** ∠2 = 70°, ∠3 = 110°

14. True   **15.** 50°   **16.** (b) trapezium   **17.** False   **18.** (c) 6   **19.** (a) $\frac{1}{4}$ **20.** (d) 8

21. $3\sqrt{2} + 2\sqrt{3}$ **22.** (i) IVth quadrant   (ii) IVth quadrant   (iii) IIIrd quadrant   (iv) IInd quadrant

24. 384 m²   **25.** Straight line   **27.** $\frac{7}{16}, \frac{1}{2}$ and $\frac{9}{16}$ **28.** (5x – 3y) (5x – 3y) (5x – 3y) Or 36

30. 40,000 Or 22 : 15   **31.** (i) $\frac{1}{10}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{4}$ **33.** Class size = 5, Class-limit = 44.5 – 49.5 Or p = 12

34. 9 cm   **36.** $\frac{-13}{3}$ Or (x – 1) (x – 2) (x – 4)   **38.** (i) 110   (ii) 2.198 m³   Or 10 cm

39.

40.

MODEL TEST PAPER-3

Time Allowed : 3 Hours   **Max. Marks : 80**

*General Instructions : Same as Model Test Paper-1*

Section A

*Question number 1 to 20 carry 1 mark each.*

Q. 1. Value of $\sqrt[3]{4} \times \sqrt[3]{16}$ is equal to :
    (a) 8   (b) 4   (c) 2   (d) 1

Q. 2. -25.6875 in the form of $\frac{p}{q}$ is equal to :
    (a) $\frac{-411}{16}$ (b) $\frac{408}{15}$ (c) $\frac{400}{9}$ (d) $\frac{-212}{57}$

Q. 3. $6^8 \times 6^{-5}$ is equal to :
    (a) 1   (b) 6^3 (c) 6^{-3} (d) 0

Q. 4. If $x + y = 12$ and $xy = 32$ then value of $x^2 + y^2$ is :
    (a) 80   (b) 90   (c) 120   (d) 140

Q. 5. Fill in the blank in the following statement :

Degree of the polynomial $3x^4 + 2x^3 - \frac{x^2}{3} - \frac{x}{2} + 1$ is _____ .

Q. 6. State True or False :
The point (0, 2) lies on the x-axis.

Q. 7. Write two solutions of the linear equation $4x + 3y = 12$.

Q. 8. Zeroes of the polynomial $2x^2 - 18$ are :
    (a) $-3, 3$ (b) $-9, 9$ (c) 2, 18   (d) 1, 6

Q. 9. If $p(x) = x + 5$, then $p(x) + p(-x)$ is equal to :
    (a) 5   (b) 10   (c) 0   (d) 1

Q. 10. Which of the following points lies in second quadrant :
    (a) (0, 1)   (b) (2, –5)   (c) (–3, 6)   (d) (2, 2)

Q. 11. Area of an equilateral triangle with side $4\sqrt{3}$ cm is equal to :
    (a) $12\sqrt{3}$ sq. units   (b) $24\sqrt{3}$ sq. units   (c) $8\sqrt{3}$ sq. units   (d) $6\sqrt{3}$ sq. units

Q. 12. Degree measure of each angle of a rectangle is equal to :
    (a) 45°   (b) 60°   (c) 75°   (d) 90°

Q. 13. In figure, POQ is a line. The value of x is :
    (a) 20°   (b) 25°
    (c) 30°   (d) 35°
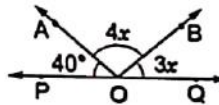
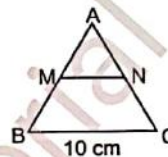**Q. 14.** State True or False :

Sides opposite to equal angles of a triangle are unequal.

Q. 15. In the given figure, if AD is the median then find $\angle BAD$.
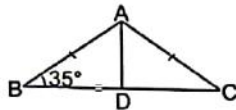
Q. 16. Angles of a quadrilateral are in the ratio $1 : 2 : 3 : 4$.

Find all angles.

Q. 17. In an equilateral $\triangle ABC$ of side 10 cm and MN || BC, where M and N are mid-points of sides AB and AC respectively.

Find the length of MN.

Q. 18. Find the value of $(2x + y)^2 + (2x - y)^2$.

Q. 19. Find the value of x in the equation $y = 3x + 6$, when $y = 5$.

Q. 20. Find the product of the coefficients of x and x^3 in the following polynomial :

$$7x^4 + \frac{2x^3}{5} + \frac{4}{5}x^2 - \frac{9}{8}x + 10$$

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. The area of equilateral triangle is $64\sqrt{3}$ cm². Find the base of the equilateral triangle and perimeter.

Q. 22. In the given figure, find the value of x.
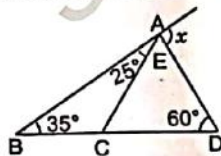
Q. 23. On which axis do the given points lie ?

    (i) $(-2, 0)$ *(ii)* $(0, -5)$

    (iii) $(3, 0)$ *(iv)* $(0, 3)$

Q. 24. If two supplementary angles are in the ratio $2 : 3$, then find the angles.

Q. 25. If $x^{99} + 99$ is divisible by $x - 1$, find the remainder.

Q. 26. Simplify :

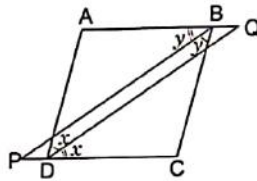   *(i)* $(6 + \sqrt{6})(6 - \sqrt{6})$ *(ii)* $(3 + 2\sqrt{2})(3 - 2\sqrt{2})$

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. In figure, bisectors of $\angle B$ and $\angle D$ of quadrilateral ABCD meet CD and AB produced at P and Q respectively.

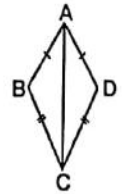Prove that $\angle P + \angle Q = \frac{1}{2} (\angle ABC + \angle ADC)$

Or

In the given figure, ABCD is a quadrilateral in which AB = AD and BC = DC.
Prove that

(i) AC bisects $\angle A$ and $\angle C$ 　　　(ii) $\angle ABC = \angle ADC$

Q. 28. If $x = \dfrac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ and $y = \dfrac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$, find $x^2 + y^2$.

Q. 29. Check whether the following is true or false :
$$(a + b)^3 + (b + c)^3 + (c + a)^3 - 3(a + b)(b + c)(c + a) = 2(a^3 + b^3 + c^3 - 3abc)$$

Or

Find the value of a, if $(x - 2)$ is a factor of $x^5 - 3x^4 - ax^3 + 3ax^2 + 2ax + 4$.

Q. 30. One side of a right triangle measures 126 m and the difference in length of its hypotenuse and other side is 42 m. Find the measure of its two unknown sides and calculate its area.

Or

The perimeter of a rhombus is 20 cm. One of its diagonal measures 8 cm. Find the area of the rhombus and measure of the other diagonal.

Q. 31. Find the missing frequency in the following table. It is given that the mean of the data is 20.6.

x	10	15	20	25	35
f	3	10	a	7	5

Q. 32. In the given figure, AD is the median through A and E is the mid-point of AD. BE produced meets AC in F.

Prove that $AF = \frac{1}{3} AC$.
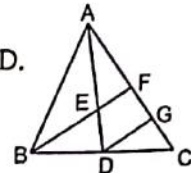
Q. 33. The mean of 40 observations was 160. It was detected on rechecking that the value of 165 was wrongly copied as 125 for computation of mean. Find the correct mean.

Or

Find the median of the following observations :
46, 64, 87, 41, 58, 77, 35, 90, 55, 92, 33. If 92 is replaced by 99 and 41 by 43 in the above data, find the new median.

Q. 34. The circumference of the base of a cylinder is 132 cm and its height 25 cm. Find the volume of the cylinder.
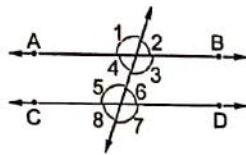
Section D

Question numbers 35 to 40 carry 4 marks each.

Q. 35. The sides BC, CA and AB of ∆ABC are produced in order, forming exterior angles ∠ACD, ∠BAE and ∠CBF. Show that ∠ACD + ∠BAE + ∠CBF = 360°.

Or

In the given figure, AB ∥ CD and ∠1 : ∠2 = 3 : 2.
Find all angles from 1 to 8.

Q. 36. Show that the points A(1, 2), B(– 1, – 16) and C(0, – 7) lies on the graph of the linear equation $y = 9x – 7$.   *[NCERT EXEMPLAR]*

Or

Draw the graph of the two linear equations $x + 2y = 5$ and $y – x = 4$ on a same graph paper. Also, from the graph, find the coordinates of the point of intersection of these two lines.

Q. 37. In a ∆ ABC, if lines are drawn through A, B, C parallel respectively to the sides BC, CA and AB, forming ∆ PQR as shown in the figure, show that BC = $\frac{1}{2}$ QR.

Q. 38. Construct a triangle, given that its base is 3.8 cm and the difference of the other two sides is 1.8 cm and one base angle of 30°.

Q. 39. A right circular cone is 4.1 cm high and the radius of its base 2.1 cm. Another right circular cone is 4.3 cm high and the radius of the base is 2.1 cm. Both the cones are melted and recast into a sphere. Find the diameter of the sphere.

Or

A solid right circular cylinder of radius 8 cm and height 2 cm is melted and recast into a right circular cone of height 3 times that of the cylinder. Find the curved surface of the cone.

Q. 40. A die is thrown 2000 times with the following frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given the following table.

Outcomes	1	2	3	4	5	6
Frequency	272	158	350	378	720	122

Find the probability of the happening of each outcome.

ANSWERS

1. (b) 4
2. (a) $\dfrac{-411}{16}$
3. (b) 6^3
4. (a) 80
5. 4
6. false

7. $x = 3, y = 0$ and $x = 0, y = 4$
8. (a) –3, 3
9. (b) 10
10. (c) (–3, 6)

11. (a) $12\sqrt{3}$ sq. units
12. (d) 90°
13. (a) 20°
14. False
15. 55°

16. 36°, 72°, 108°, 144°
17. 5 cm
18. $8x^2 + 2y^2$
19. $x = \dfrac{-1}{3}$
20. $\dfrac{-9}{20}$

21. Base = 16 cm, Perimeter = 48 cm
22. 120°
23. (i) x-axis (ii) y-axis (iii) x-axis (iv) y-axis

24. 72°, 108°
25. 100
26. (i) 30 (ii) 1
28. 98
29. True *Or* $\dfrac{3}{2}$

30. Hypotenuse = 210 m, other side = 168 m, Area = 10584 m² *Or* 24 cm², 6 cm
31. $a = 25$

33. 161 *Or* Original median = New median = 58
34. 34650 cm³

35. $\angle 1 = \angle 3 = \angle 5 = \angle 7 = 108°$, $\angle 2 = \angle 4 = \angle 6 = \angle 8 = 72°$
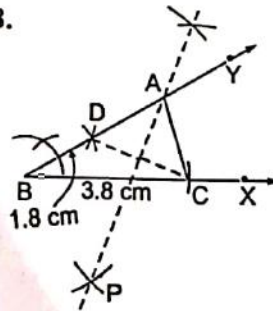
36.
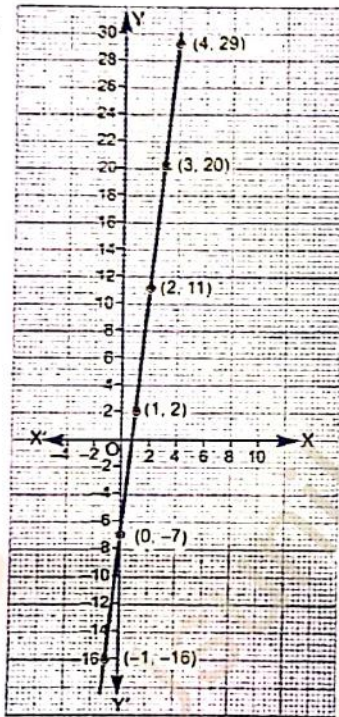
Or
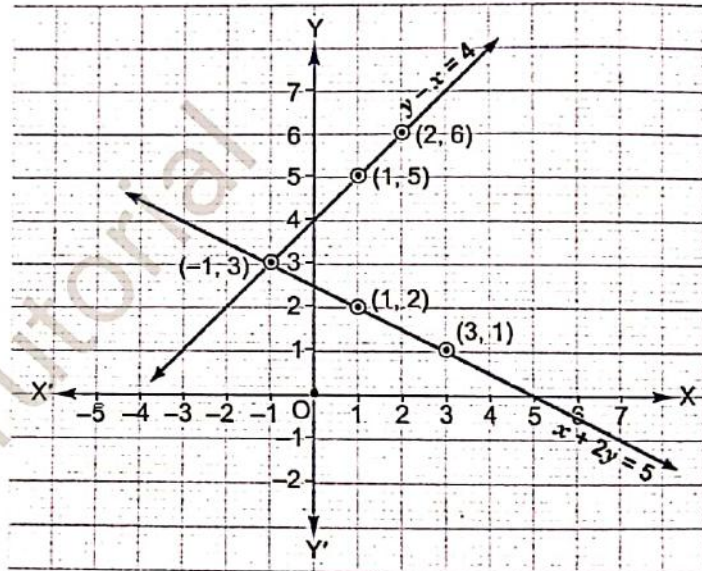
Point of intersection = (–1, 3)

38.

39. 4.2 cm *Or* 251.42 cm²

40. 0.136, 0.079, 0.175, 0.189, 0.360, 0.061

MODEL TEST PAPER–4

Time Allowed : 3 Hours   **Max. Marks : 80**

*General Instructions : Same as Model Test Paper-1*

Section A

Question number 1 to 20 carry 1 mark each.

Q. 1. Value of $\dfrac{x^{a(b-c)}}{x^{b(a-c)}} \times \left(\dfrac{x^a}{x^b}\right)^c$ is equal to

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

Q. 2. Decimal form of $\dfrac{4}{5}$ is :

(a) 0.8   (b) 0.9   (c) 0.10   (d) 0.12

Q. 3. Write True or False :
Rational number is either terminating or non terminating in nature.

Q. 4. Find the value of x when $y = 2$ in the linear equation $6x + 2y = 12$.

Q. 5. Degree of the polynomial $2x^5 + 4x^3 - 2x^2 - 5x + 2$ is :
(a) 2   (b) 3   (c) 4   (d) 5

Q. 6. The coordinates of origin are :
(a) (1, 0)   (b) (0, 1)   (c) (0, 0)   (d) (–1, 0)

Q. 7. Equation of the x-axis is :
(a) $x = 0$ (b) $y = 0$ (c) $x = 1$ (d) $y = 1$

Q. 8. Zeroes of the polynomial $x^2 - 9x + 20$ are :
(a) –4, 5   (b) 4, –5   (c) –4, –5   (d) 4, 5

Q. 9. Product of coefficients of x^3 and x^4 in the polynomial $7x^4 + 6x^3 + 5x^2 + 4x + 3$ is :
(a) 42   (b) 13   (c) 30   (d) 12

Q. 10. A point having both coordinates with positive sign, lies in which quadrant ?
(a) first   (b) second   (c) third   (d) fourth

Q. 11. Area of a right triangle with hypotenuse 5 cm and base 3 cm is :
(a) 4 sq. units   (b) 6 sq. units   (c) 8 sq. units   (d) 12 sq. units

Q. 12. In figure, $\angle POR$ and $\angle QOR$ form a linear pair. If $a - b = 80°$, then find the values of a and b.
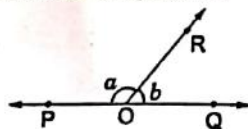
Q. 13. In the figure, $\angle AOC$ and $\angle BOC$ form a linear pair.
Find the value of x.
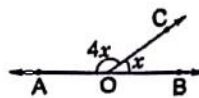
Q. 14. Fill in the blank in the following statement :

The point of intersection of all the three medians of a triangle is called _____ .

Q. 15. Write the degree measure of each angle of a square.

Q. 16. Three angles of a quadrilateral are 60°, 70° and 80°. Fourth angle is :

(a) 100°   (b) 120°   (c) 130°   (d) 150°

Q. 17. State True or False :

If two angles of a triangle are equal, then sides opposite to them are also equal.

Q. 18. Find the value of $(20)^3 + (5)^3 - (25)^3$.

Q. 19. At what point the line representing the linear equation $7x + 4y = 28$ meets the x-axis.

Q. 20. If polynomial $p(x) = x^2 + \sqrt{2}x + 1$, then find the value of $p(3\sqrt{2})$.

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. If $a + b = 6$ and $ab = 8$, find the value of $a^3 + b^3$.

Q. 22. ABCD is a trapezium in which AB ∥ DC and $\angle A = \angle B = 45°$. Find angles C and D of the trapezium.

Q. 23. In the given figure, if AB ∥ DE, $\angle BAC = 35°$ and $\angle CDE = 53°$, find $\angle DCE$.
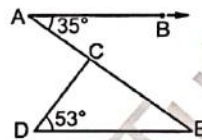
Q. 24. The perimeter of a rectangle is 25.5 m. Its length is 9.5 m. Calculate its area in sq. m.

Q. 25. Name the quadrant on which the following points lie

(i) (8, 7)   (ii) (– 3, 8)   (iii) (2, – 7)   (iv) (– 5, – 4)

Q. 26. Simplify : $6\sqrt[3]{2} \times 3\sqrt[3]{4}$.

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Prove that :

$$\frac{a^{-1}}{a^{-1}+b^{-1}} + \frac{a^{-1}}{a^{-1}-b^{-1}} = \frac{2b^2}{b^2-a^2}$$

Q. 28. Simplify : $(x + y + z)^2 + \left(x + \dfrac{y}{2} + \dfrac{z}{3}\right)^2 - \left(\dfrac{x}{2} + \dfrac{y}{3} + \dfrac{z}{4}\right)^2$.
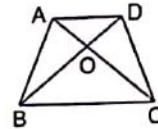
Or

What must be added to $x^3 - 3x^2 - 12x + 19$ so that the result is exactly divisible by $x^2 + x - 6$?

Q. 29. Show that the quadrilateral formed by joining the mid-points of the pairs of adjacent sides of a square is a square.

Or

ABCD is a trapezium and BD, AC are the diagonals intersecting each other at O. If BC = 2AD, then show that O is the point of trisection of both the diagonals.

Q. 30. How many tiles each of area 20 cm² will be required to cover a footpath of width 1 m carried around the outside of a grass plot of 28 m long and 18 m broad.

Or

The perimeter of a right triangle is 12 cm and its hypotenuse is of length 5 cm. Find the other two sides and calculate its area. Verify the result using Heron's formula.

Q. 31. Two coins are tossed simultaneously for 400 times, and we get

Two Tails : 128 times
One Tail : 140 times
No Tail : 132 times

Find the probability of occurrence of each of these events.

Q. 32. The arithmetic mean of the following frequency distributions is 30.5. Find x.

Marks	10	20	x	40	50
Frequency	8	10	20	15	7

Or

The following data has been arranged in ascending order : 24, 27, 28, 31, 34, x, 37, 40, 42, 45. If the median of the data is 35, find x. In the data, if 45 is changed to 33, find the new median.

Q. 33. In the figure, ABC is a triangle in which AB = AC and P is a point on AC. Through C, a line is drawn to intersect BP produced at Q and $\angle ABQ = \angle ACQ$.
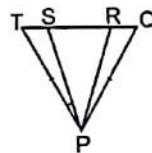
Prove that $\angle AQC = 90° + \dfrac{1}{2} \angle BAC$.
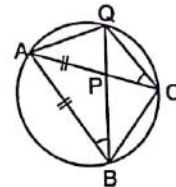
Q. 34. The difference between inside and outside surfaces of a cylindrical tube 14 cm long is 88 sq. cm. If the volume of the tube is 176 cubic cm, find the inner and outer radii of the tube.
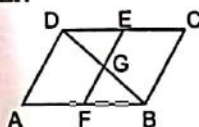
Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. In the figure, PQ = PT and $\angle TPS = \angle QPR$.
Prove that triangle PRS is isosceles.

Or

In the given figure, AD = CB, AB = CD and EF bisects BD at G.
Prove that G is the mid-point of EF.

Q. 36. If the work done by a body on application of a constant force is directly proportional to the distance travelled by the body, Niraj expresses this in the form of an equation in two variables and draw the graph of the same by taking the constant force as 5 units. Also, from the graph read the work done when the distance travelled by the body is (i) 0 units (ii) 1.5 units.

Or

The following values of x and y are thought to satisfy a linear equation.
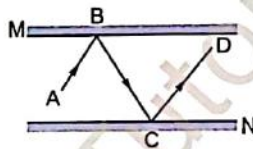
x	1	2
y	1	3

Draw the graph, using the values of x and y as given in the table.
At what point the graph of the linear equation
(i) cuts the x-axis ? (ii) cuts the y-axis ?

Q. 37. Prove that M and N are two plane mirrors parallel to each other, if the incident ray AB is parallel to the reflected ray CD.

Q. 38. A spherical ball of lead 3 cm in diameter is melted and recast into three spherical balls. If the diameters of two balls be $\frac{3}{2}$ cm and 2 cm, find the diameter of the third ball.

Or

A right-angled triangle of which the sides containing the right angle are 8 cm and 15 cm in length is made to turn round on the longer side. Find the volume of the solid thus generated.

Q. 39. Construct △ PQR, given that its perimeter is 10.4 cm and base angles are of 45° and 60°.

Q. 40. Represent the following distribution by a frequency polygon.

| Scores	20—29	30—39	40—49	50—59	60—69	70—79	80—89	90—99
Frequency	1	1	3	14	20	22	12	2

ANSWERS

1. (b) 1   2. (a) 0.8   3. True   4. $x = \frac{4}{3}$ 5. (d) 5   6. (c) (0, 0)   7. (b) y = 0

8. (d) 4, 5   9. (a) 42   10. (a) first   11. (b) 6 sq. units   12. a = 130°, b = 50°   13. 36°

14. centroid   15. 90°   16. (d) 150°   17. True   18. –7500   19. (4, 0)   20. 25

21. 72   22. ∠C = ∠D = 135°   23. 92°   24. 30.9 sq. m

25. (i) Ist quadrant   (ii) IInd quadrant   (iii) IVth quadrant   (iv) IIIrd quadrant

26. 36   28. $\frac{7}{4x^2} + \frac{41}{36y^2} + \frac{151}{144z^2} + \frac{8}{3xy} + \frac{13}{6yz} + \frac{29}{12zx}$ Or 2x + 5

30. 48000 tiles Or 3 cm, 4 cm, 6 cm²   31. 0.32, 0.35, 0.33
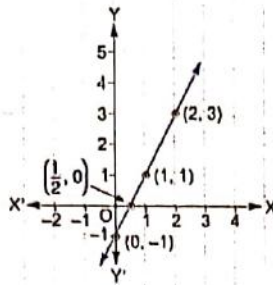
32. 30 *Or* x = 36, 33.5 **34** 1.5 cm, 2.5 cm
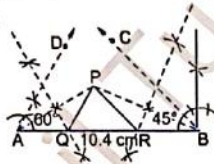
36.
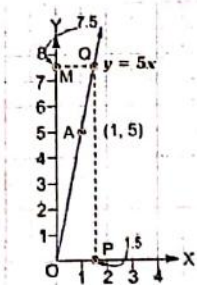
(i) No work   (ii) 7.5 units

Or

(i) $\left(\frac{1}{2}, 0\right)$ (ii) (0, – 1)

40.

38. 2.5 cm *Or* 1005.71 cm³

39.
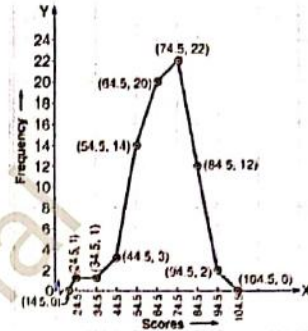
MODEL TEST PAPER–5

Time Allowed : 3 Hours   *Max. Marks : 80*

General Instructions : Same as Model Test Paper-1

Section A

Question number 1 to 20 carry 1 mark each.

Q. 1. Decimal representation of $\frac{327}{500}$ is :

(a) 0.654   (b) 0.645   (c) 0.582   (d) 0.480

Q. 2. If $8^{x+1} = 64$, then value of 3^{2x+1} is :

(a) 19   (b) 23   (c) 25   (d) 27

Q. 3. Which of the following is not a natural number ?

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

Q. 4. Values of x and y which satisfy the linear equations x + y = 8 and x – y = 0 are :

(a) x = 8, y = 0   (b) x = 5, y = 3   (c) x = 4, y = 4   (d) x = 7, y = 1

Q. 5. Degree of the polynomial $6x^6 + 5x^5 + 4x^4 + 9x^3 + 10x^2 + 1$ is:

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

Q. 6. Which of the following points lies on the y-axis ?
(a) (3, 5)   (b) (–4, 0)   (c) (0, 8)   (d) (2, 6)

Q. 7. If $x + 3$ is a factor of $3x^2 + kx + 2$, then value of k is :
(a) $\frac{5}{8}$ (b) $\frac{29}{3}$ (c) $\frac{15}{7}$ (d) $\frac{14}{9}$

Q. 8. If $x + y = 12$ and $xy = 22$, then value of $x^2 + y^2$ is :
(a) 100   (b) 90   (c) 115   (d) 120

Q. 9. If $a + 2b + 3c = 0$, then prove that $a^3 + 8b^3 + 27c^3 = 18abc$.

Q. 10. Sum of x coordinate and y coordinate of the point (–6, 6) is equal to :
(a) 0   (b) –12   (c) 12   (d) 6

Q. 11. Area of a triangle having base 10 cm is 120 cm^2. Height of the triangle is equal to :
(a) 12 cm   (b) 18 cm   (c) 24 cm   (d) 27 cm

Q. 12. State true of false :
If two chords of a circle are equal, then their corresponding arcs are congruent.

Q. 13. In the figure, name the type of $\angle 2$ and $\angle 8$.
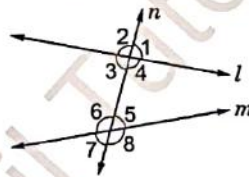
Q. 14. Fill in the blank in the following statement :
Orthocentre is defined as the point of intersection of all the _____ of a triangle.

Q. 15. Write True or False :
A trapezium is said to be an isosceles trapezium if its parallel sides are equal.

Q. 16. In a ‖ ^{gm} ABCD, if $\angle A = 115°$, then find $\angle B$, $\angle C$ and $\angle D$.
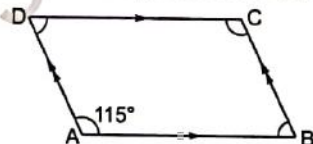
Q. 17. Is it possible to construct a triangle with lengths of its sides 8 cm, 6 cm and 16 cm ?

Q. 18. Factorize : $27x^3 + y^3 + z^3 - 9xyz$.

Q. 19. If $f(x) = 4x^3 + 2x^2 + 5x - 7$, find $f(2)$.

Q. 20. Find the value of k, if $x = 3$, $y = 2$ is the solution of equation $4x + ky = 14$.

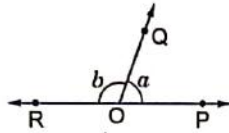## Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Express the linear equation $x - \frac{y}{5} - 10 = 0$ in the form $ax + by + c = 0$ and indicate the values of a, b and c.

Q. 22. Write the quadrant in which the points $(3, -2)$ and $(1, 4)$ lie.

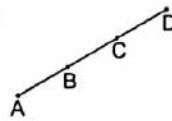**Q. 23.** In the figure, OP and OR are two opposite rays.

    (i) If $a = 70°$, find b.   (ii) If $b = 105°$, find a.

Q. 24. In a box whose dimensions are $12\ cm \times 4\ cm \times 3\ cm$, find the longest stick that can be placed.

Q. 25. In the given figure, if $AB = CD$, then prove that $AC = BD$.

Q. 26. Simplify and express the result in each of the following in its simplest form :

    (i) $\sqrt[3]{4} \times \sqrt[3]{22}$ (ii) $\sqrt[6]{2} \times \sqrt[4]{2} \times \sqrt[12]{32}$

Section C

Question number 27 to 34 carry 3 marks each.

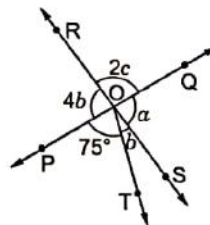**Q. 27.**   (i) If $a + b = 1$, prove that $a^3 + b^3 + 3ab = 1$.

      (ii) If $a + 2b + 3c = 0$, then prove that $a^3 + 8b^3 + 27c^3 = 18abc$

<p align="center">Or</p>

    If $x^3 + ax^2 - bx + 10$ is divisible by $x^2 - 3x + 2$, find the values of a and b.

Q. 28. In the given figure, two straight lines PQ and RS intersect each other at O. If $\angle POT = 75°$, find the values of a, b and c.

<p align="center">Or</p>

If the bisectors of a pair of corresponding angles formed by a transversal with two given lines are parallel, prove that the given lines are parallel.

Q. 29. Lalita has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops to suffice the needs of their family. She divided the land in two equal parts. If the perimeter of the land is 80 m and one of the diagonals is 24 m, how much area each of them will get ?

<p align="center">Or</p>

A rectangular park is 65 m long and 50 m wide. Two cross paths, each 2 m wide, are to be constructed parallel to the sides. If these paths pass through the centre of the rectangle and cost of construction is ₹17.25 per sq. m, find the total cost invovled in the construction of the paths.

Q. 30. The blood groups of 30 students of Class IX are recorded as follows :
A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O, A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O.
A student is selected at random from the class for blood donation. Find the probability that the blood group of the student chosen is :

(i) A   (ii) B   (iii) AB

Q. 31. If x is the length of side of an equilateral triangle, then prove that its area is $\frac{\sqrt{3}}{4}x^2$.

Q. 32. Express each of the following into decimal form by long division method :

(i) $-\frac{4}{9}$ (ii) $\frac{437}{999}$ (iii) $\frac{33}{26}$

Q. 33. The following table shows the daily production of T.V. sets in an industry for 7 days of a week

Day	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
No. of T.V. Sets	300	400	150	250	100	350	200

Represent the above information by a bar graph.

Or

The following table presents the number of literate females in a town :

Age Group	10—15	15—20	20—25	25—30	30—35	35—40
Number of females	300	980	800	480	700	430

Draw a histogram to present the above data.

Q. 34. A factory manufactures 1,20,000 pencils daily. The pencils are cylindrical in shape, each of length 25 cm and circumference 1.5 cm. Determine the cost of colouring the curved surfaces of the pencils manufactured in one day at ₹ 0.05 per dm^2.
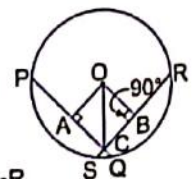
Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. AB and CD are two chords of a circle such that AB = 6 cm, CD = 12 cm and AB ‖ CD. If the distance between AB and CD is 3 cm, then find the radius of the circle.

Or

In figure, equal chords PQ and RS of a circle with centre O cut at right angle at C. If A and B are the mid-points of PQ and RS respectively, then prove that OACB is a square.
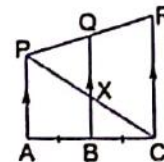
Q. 36. In the given figure, B is the mid-point of AC and AP ‖ BQ ‖ CR. Prove that :

(i) $BX = \frac{1}{2}AP$ (ii) AP + CR = 2BQ

Q. 37. A hemispherical dome of a stupa needs to be painted. If the circumference of the base of the dome is 17.6 m, find the cost of painting it, given the cost of painting is ₹ 5 per 100 cm^2.

Or

A cylinder is within the cube touching all the vertical faces. A cone is inside the cylinder. If their heights are same with the same base, find the ratio of their volumes.

Q. 38. Construct a right triangle whose length of base is 4 cm and sum of its hypotenuse and other side is 8 cm.

Q. 39. One pencil costs ₹ 2 and one fountain pen costs ₹ 15. If Sheela pays ₹ 100 to purchase pencils and fountain pen, write a linear equation and draw a graph with this data.

Or

If the temperature of a liquid can be measured in kelvin units as $x°K$ or in fahrenheit units as $y°F$, the relation between the two systems of measurement of temperature is given by the linear equation.
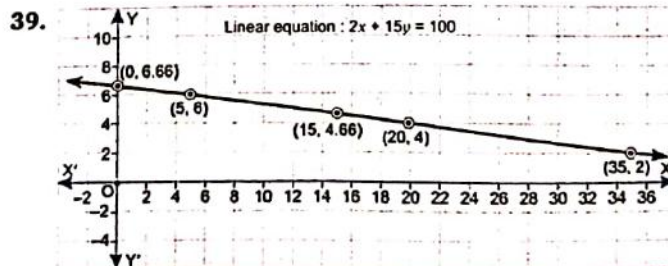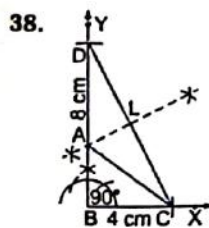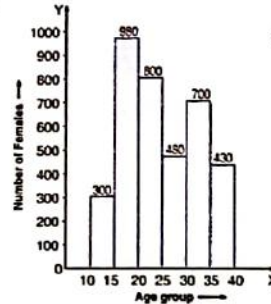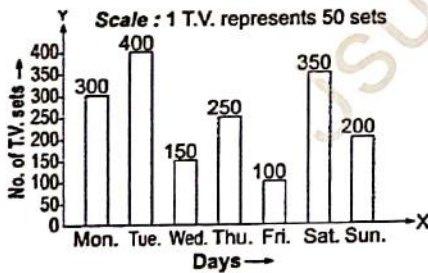
$$y = \frac{9}{5}(x - 273) + 32$$

(i) find the temperature of the liquid in fahrenheit, if the temperature of the liquid is 313K.
(ii) If the temperature is 158°F, then find the temperature in kelvin.

Q. 40. Find the value of p, if the mean of the following distribution is 20.

x	15	17	19	$20 + p$	23
f	2	3	4	$5p$	6

[ANSWERS]

1. (a) 0.654   2. (d) 27   3. (a) 0   4. (c) $x = 4, y = 4$ 5. (d) 6   6. (c) (0, 8)   7. (b) $\frac{29}{3}$ 8. (a) 100

10. (a) 0   11. (c) 24 cm   12. True   13. Alternate exterior angles   14. altitudes   15. False
16. $\angle B = 65°, \angle C = 115°, \angle D = 65°$ 17. No   18. $(3x + y + z)(9x^2 + y^2 + z^2 - 3xy - yz - 3zx)$

19. 43   20. $k = 1$ 21. $a = 1, b = \frac{-1}{5}, c = -10$ 22. Fourth quadrant, first quadrant

23. (i) 110° (ii) 75° 24. 13 cm 26. (i) $2\sqrt[3]{11}$ (ii) $\sqrt[6]{32}$ 27. $a = 2, b = 13$ 28. $a = 84°, b = 21°, c = 48°$

29. 384 m² Or ₹ 3898.50   30. (i) $\frac{3}{10}$ (ii) $\frac{1}{5}$ (iii) $\frac{1}{10}$ 32. (i) $-0.\overline{4}$ (ii) $0.\overline{437}$ (iii) $1.\overline{2692307}$

33.

Scale : 1 T.V. represents 50 sets   Or

34. ₹ 2250   35. 6.7 cm
37. ₹ 24640 Or 42 : 33 : 11

38.

39.

Linear equation : $2x + 15y = 100$

Or (i) 104°F
(ii) 343°k

40. $p = 1$