MODEL TEST PAPER–6

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 $\left(\dfrac{256}{81}\right)^{5/4}$ is equal to :

(a) $\dfrac{4}{3}$ (b) $\dfrac{16}{9}$ (c) $\dfrac{1000}{231}$ (d) $\dfrac{1024}{243}$

Q. 2. Decimal form of $\dfrac{6}{5}$ is :

(a) 1.2 (b) 1.3 (c) 1.4 (d) 1.5

Q. 3. Write True or False :

$\sqrt{5}$ is a rational number.

Q. 4. If $x - y = 4$ and $xy = 21$, then value of $x^3 - y^3$ is :

(a) 316 (b) 320 (c) 324 (d) 328

Q. 5. Value of y, when $x = -1$ in the linear equation $3x + 2y = 6$ is :

(a) $\dfrac{5}{2}$ (b) $\dfrac{7}{2}$ (c) $\dfrac{9}{2}$ (d) $\dfrac{11}{2}$

Q. 6. How many dimensions does a point have ?

Q. 7. Equation of a line passing through the point $(1, 5)$ is :

(a) $2x + 5y = 10$ (b) $3x - 2y = 12$ (c) $4x + 2y = 14$ (d) $2x + y = 5$

Q. 8. If $f(x) = 2x^3 + 3x^2 - 11x - 6$, then $f\left(\dfrac{-1}{2}\right)$ is equal to :

(a) 0 (b) 1 (c) −1 (d) 2

Q. 9. Equation of a line passing through point $(3, 0)$ and parallel to the y-axis is :

(a) $y = 3$ (b) $x = 3$ (c) $x + y = 3$ (d) $x - y = 3$

Q. 10. The base of an isosceles triangle is 12 cm and its perimeter is 32 cm. Area of the triangle is :

(a) 48 cm² (b) 54 cm² (c) 62 cm² (d) 70 cm²
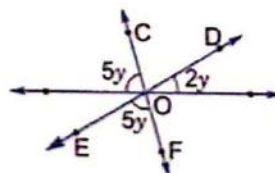
Q. 11. State True or False :

The point $(6, -5)$ lies in fourth quadrant.

Q. 12. Fill in the blank in the following statement :

Chords of a circle which are _____ from the centre are equal.

Q. 13. Value of y in the given figure is :

(a) 15° (b) 18°

(c) 21° (d) 24°

Q. 14. The point of intersection of the perpendicular bisectors of the sides of a triangle is called :

    (a) centroid   (b) orthocentre   (c) circumcentre   (d) incentre

Q. 15. Write True or False :

    If two sides of a triangle are unequal, then longer side has greater angle opposite to it.

Q. 16. Name a quadrilateral whose all angles are right angles.

Q. 17. Name a line which is perpendicular to a line segment and divides it into two equal parts.

Q. 18. Determine whether the following is true or false :

    The value of $\dfrac{0.87 \times 0.87 \times 0.87 + 0.13 \times 0.13 \times 0.13}{0.87 \times 0.87 - 0.87 \times 0.13 + 0.13 \times 0.13}$ is 1.

Q. 19. If $x^2 + \dfrac{1}{x^2} = 23$, find the values of $x - \dfrac{1}{x}$.

Q. 20. State True or False :

    The point (0, 2) lies on the graph of linear equation $4x + 3y = 6$.

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Shaheen has drawn a quadrilateral ABCD in which vertices A(1, 2), B(– 7, 2), C(– 7, – 6) and D(1, – 6) respectively. What type of quadrilateral is formed ?

Q. 22. Find the degree of each of the polynomials :

    (i) $(y^3 - 7)(y^7 - 8)$ (ii) $(x^3 + 7)(3 - x^2)$

Q. 23. One side of an equilateral triangle measures 8 cm. Find its area using Heron's formula. What is its altitude ?

Q. 24. Find the complement and supplement of each of the following angles :

    (i) 30°   (ii) 42°

Q. 25. Find the coordinates of points :

    (i) A   (ii) B   (iii) C   (iv) D
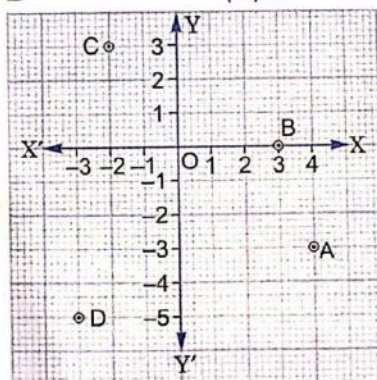
Q. 26. If $x = 1 - \sqrt{2}$, then find the value of $\left(x - \dfrac{1}{x}\right)^3$.

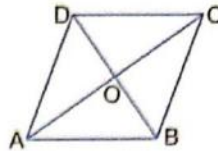## Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Show that the diagonals of a parallelogram divides it into four triangles of equal area.

Or

In the given figure, O is any point inside a parallelogram ABCD. Prove that :

(i) $ar(\triangle OAB) + ar(\triangle OCD) = \dfrac{1}{2} ar \; (\|^{gm} ABCD)$

(ii) $ar(\triangle OAD) + ar(\triangle OBC) = \dfrac{1}{2} ar \; (\|^{gm} ABCD)$

Q. 28. Using the remainder theorem, find the remainder when $f(x)$ is divided by $g(x)$ and verify the result by actual division :

$f(x) = 2x^4 - 6x^3 + 2x^2 - x + 2, \; g(x) = x + 2$

Or

Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by (i) $x - \dfrac{1}{2}$ (ii) $5 + 2x$.

Q. 29. In the given figure, ABCD is a quadrilateral and AC is one of its diagonals. Prove that :

(i) $AB + BC + CD + DA > 2AC$

(ii) $AB + BC + CD > DA$

(iii) $AB + BC + CD + DA > AC + BD$

Q. 30. A rectangular tank measuring 5 m × 4.5 m × 2.1 m is dug in the centre of the field measuring 13.5 m × 2.5 m. The earth dug out is spread evenly over the remaining portion of the field. How much is the level of the field raised ?

Or

If V is the volume of a cuboid of dimensions a, b, c and S is its surface area, then prove that

$$\frac{1}{V} = \frac{2}{S}\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$$

Q. 31. Prove that $3 - \sqrt{5}$ is an irrational number.

Q. 32. Find the mean of the following distributions :

x_i	10	15	20	25	30	35	40	Total
f_i	4	6	8	18	6	5	3	50

Q. 33. Water flows out through a circular pipe of internal diameter 2 cm at the rate of 6 metres per second into a cylindrical tank, the radius of whose base is 60 cm. Find the rise in the level of water in 30 minutes.

Q. 34. A die is thrown 1000 times with the following frequencies for the outcomes 1, 2, 3, 4, 5 and 6 given the table :

Outcome	1	2	3	4	5	6
Frequency	182	158	175	125	162	198

Find the probability of the happening of each outcome.

Or

Seventy five seeds were selected at random from each of 7 bags of seeds, and were kept under standardised conditions favourable to germination. After 30 days the number of seeds which had germinated in each collection were counted and recorded as follows :

Bag	1	2	3	4	5	6	7
No. of seeds germinated	60	50	72	49	52	73	67

What is the probability of germination of :

(i) more than 60 seeds in a bag ?   (ii) at most 67 seeds in a bag ?

(iii) at least 50 seeds in a bag ?

Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. Zarina and Shabana, two students of class IX of a school, together contributed ₹ 100 towards the Prime Minister's Relief Fund to help the earthquake victims. Write a linear equation which satisfy this data and draw the graph of the same.
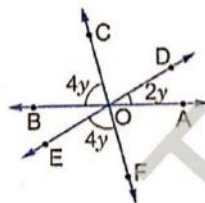
Or

Draw a graph of the line $x - 2y = 3$. From the graph, find the coordinates of the point when :

(i) $x = -5$ (ii) $y = 0$

Q. 36. (i) In the given figure, OP bisects $\angle$ BOC and OQ bisects $\angle$ AOC.
Show that $\angle$ POQ = 90°.
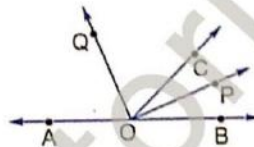

(ii) In the given figure, find the value of y.

Or

If each angle of a triangle is less than the sum of the other two, show that the triangle is acute-angled triangle.

Q. 37. Construct a $\triangle$ ABC in which BC = 5.6 cm, $\angle$ B = 60° and AB – AC = 1.5 cm.

Q. 38. The radius and height of a cone are in the ratio 4 : 3. If the area of the base is 154 cm², find the curved surface area.

Or

The radius of the internal and external surfaces of a hollow spherical shell are 3 cm and 5 cm respectively. If it is melted and recast into a solid cylinder of height $2\frac{2}{3}$ cm. Find the diameter of the cylinder.

Q. 39. In the given figure, AB and CD are equal chords of a circle whose centre is O. When produced, these chords meet at E. Prove that AE = CE.
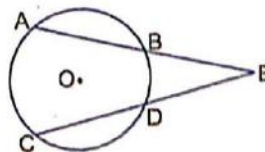
Q. 40. In a cricket match, a batsman Sachin played 40 balls. The runs scored are given in the adjoining table. Find the probability that Sachin will score :

Runs scored	0	1	2	3	4	6
No. of balls	13	15	5	1	4	2

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

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ANSWERS

1. (d) $\dfrac{1024}{243}$ **2.** (a) 1.2   **3.** False   **4.** (a) 316   **5.** (c) $\dfrac{9}{2}$ **6.** 0   **7.** (c) $4x + 2y = 14$ **8.** (a) 0

9. (b) $x = 3$ **10.** (a) $48\,cm^2$ **11.** True   **12.** equidistant   **13.** (a) 15°   **14.** (c) circumcentre   **15.** True

16. square   **17.** Perpendicular bisector   **18.** True   **19.** $\pm\sqrt{21}$ **20.** True   **21.** square   **22.** (i) 10   (ii) 5

23. $16\sqrt{3}\ cm^2, h = 4\sqrt{3}\ m$ **24.** (i) 60°, 150°   (ii) 48°, 138°

25. (i) (4, – 3) (ii) (3, 0) (iii) (– 2, 3) (iv) (– 3, – 5)   **26.** 8   **28.** 92 Or (i) $\dfrac{27}{8}$ (ii) $\dfrac{-27}{8}$

30. 4.2 m   **32.** 24.3   **33.** 3 m   **34.** 0.182, 0.158, 0.175, 0.125, 0.162, 0.198 Or (i) $\dfrac{3}{7}$ (ii) $\dfrac{3}{7}$ (iii) $\dfrac{6}{7}$

35.

Or
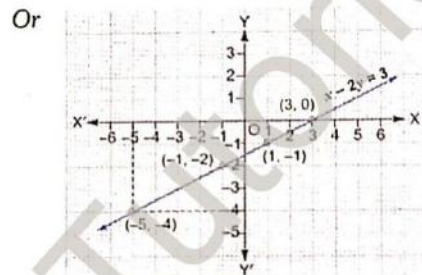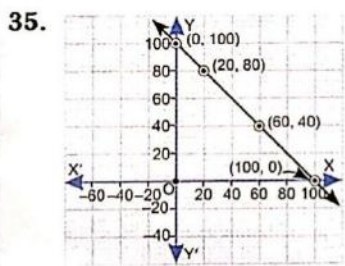
36. (ii) $y = 18°$ **37.**
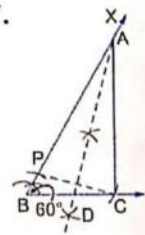
Linear equation : $x + y = 100$ (i) (–5, –4)   (ii) (3, 0)

38. $192.5\ cm^2$ Or 14 cm   **40.** (i) $\dfrac{1}{8}$ (ii) $\dfrac{1}{10}$ (iii) $\dfrac{1}{2}$ (iv) $\dfrac{1}{4}$

MODEL TEST PAPER–7

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. Which of the following is not an irrational number ?

   (a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) $\sqrt{4}$ (d) $\sqrt{11}$

Q. 2. Write True or False :
Every rational number is a whole number.

Q. 3. Fill in the blank in the following statement :

An irrational number between 2 and 2.5 is _____ .

Q. 4. If $f(x) = x^3 + 2x^2 + 5x + 1$, then value of $f(-1) + f(1)$ is equal to :

(a) 6   (b) 7   (c) 8   (d) 9

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

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

Q. 6. Point $(6, -2)$ lies in which quadrant ?

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

Q. 7. If $x^{101} + 121$ is divided by $x - 1$, then the remainder is :

(a) 120   (b) 122   (c) 124   (d) 126

Q. 8. If $x + y = 6$ and $x = y$, then value of $\frac{x}{y}$ is equal to :

(a) 3   (b) 6   (c) 1   (d) 0

Q. 9. If $56^2 - 51^2 = 5p$, then value of p is :

(a) 96   (b) 100   (c) 105   (d) 107

Q. 10. Point whose ordinate is –3 and abscissa is 5 is :

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

Q. 11. Find the area of a quadrilateral whose diagonals measure 48 m and 32 m respectively and bisect each other at right angles.

Q. 12. State True or False :

An angle is 16° more than its complement. Measure of this angles is 53°.

Q. 13. If the angles of a triangle are in the ratio 2 : 3 : 4, then the largest of the three angles is :

(a) 40°   (b) 60°   (c) 80°   (d) 100°

Q. 14. Degree measure of each angle of a rectangle is :

(a) 30°   (b) 45°   (c) 60°   (d) 90°

Q. 15. Fill in the blank in the following statement :

The line segment joining the mid points of any two sides of a triangle is _____ to the third side and equal to _____ of it.

Q. 16. What is the sum of any pair of consecutive angles of a parallelogram ?

Q. 17. State True or False :

The medians of a triangle are concurrent.

Q. 18. Find the product : $(2x + 3y)(4x^2 - 6xy + 9y^2)$.

Q. 19. Evaluate using suitable identity :

$190 \times 190 - 140 \times 140$

Q. 20. Sum of zero of the polynomial $3x + 5$ and zero of the polynomial $2x - 2$ is :

(a) $\frac{-7}{3}$ (b) $\frac{-5}{3}$ (c) $\frac{-2}{3}$ (d) $\frac{-4}{3}$

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Write the signs of the abscissa and ordinate of a point in the :
   (i) first quadrant   (ii) second quadrant   (iii) third quadrant   (iv) fourth quadrant

Q. 22. A number when added to its half gives 63. Find the number.

Q. 23. In supplementary angles, one is twice the other. Find the angles.

Q. 24. Find the area of triangle, two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.

Q. 25. In figure, PQRS is a cyclic quadrilateral. Find the measure of each of its angles.
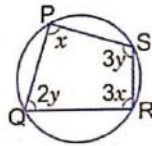
Q. 26. Fill in the blanks :
   (i) $\frac{p}{q}$ form of 15.75 is _____ .   (ii) $\frac{p}{q}$ form of 8.0025 is _____ .

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Find the following products :
   (i) $(x + y + 2z)(x^2 + y^2 + 4z^2 - xy - 2yz - 2zx)$
   (ii) $(2x - y + 3z)(4x^2 + y^2 + 9z^2 + 2xy + 3yz - 6xz)$

Or

The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $(x - 4)$ leave the remainders k_1 and k_2 respectively. Find the values of a in each of the following cases, if : (i) $k_1 = k_2$ (ii) $k_1 + k_2 = 0$.

Q. 28. In the given figure, PR > PQ and PS is the bisector of $\angle$ QPR. Show that $\angle$ PSR > $\angle$ PSQ.

Or

O is any point in the interior of Δ ABC. Prove that :
   (i) AB + AC > OB + OC
   (ii) AB + BC + CA > OA + OB + OC
   (iii) OA + OB + OC > $\frac{1}{2}$ (AB + BC + CA)
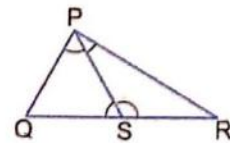
Q. 29. A metallic sheet is of the rectangular shape with dimensions 56 cm × 48 cm. From each one of it corners, a square of 6 cm is cut off. An open box is made of the remaining sheet. Find the volume of the box.

Or

In the given figure, you see the frame of a lamp-shade. It is to be covered with a decorative cloth. The frame has a base diameter of 14 cm and height of 20 cm. A margin of 2 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lamp shade ?
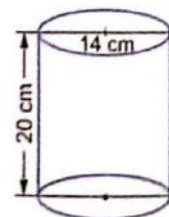
Q. 30. A die is thrown 1000 times with the following frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the table :

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	174	191

Find the probability of happening of each outcome.

Q. 31. The diagonals of a parallelogram ABCD intersect at O. A line through O intersects AB at X and DC at Y. Prove that OX = OY.

Q. 32. Simplify each of the following :

(i) $3\sqrt{147} - \dfrac{7}{3}\sqrt{\dfrac{1}{3}} + 7\sqrt{\dfrac{1}{3}}$

(ii) $\sqrt{3 \times 5^{-3}} \div \sqrt[3]{3^{-1}} \ \sqrt{5} \times \sqrt[6]{3 \times 5^{4}}$

Q. 33. Find the unknown entries (b, c, d, e, f, g) from following frequency distribution of height of 50 students in a class.

Class intervals (Heights in cm)	Frequency	Cumulative frequency
150—155	12	12
155—160	b	25
160—165	10	c
165—170	d	43
170—175	e	48
175—180	2	f
Total	g	

Or

Construct a frequency polygon for the following data without using histogram :

Age (in years)	0—2	2—4	4—6	6—8	8—10	10—12	12—14	14—16	16—18
Frequency	2	4	6	8	9	6	5	3	1

Q. 34. A table cover of size 4 m × 2 m is spread on a meeting table. If a uniform width of 25 cm of the table cover is hanging all around the table, find the cost of polishing the table top at ₹ 2.25 per square metre.

Section D

Question numbers 35 to 40 carry 4 marks each.

Q. 35. In the adjoining figure, ABCD is a parallelogram in which ∠BAO = 35°, ∠DAO = 40° and ∠COD = 105°.
Calculate :

(i) ∠ABO (ii) ∠ODC
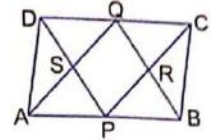
(iii) ∠ACD (iv) ∠CBD
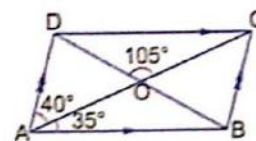
Or

ABCD is a parallelogram in which P and Q are mid-points of opposite
sides AB and CD (see figure).
If AQ intersects DP at S and BQ intersects CP at R, show that :
  (i) APCQ is a parallelogram.   (ii) DPBQ is a parallelogram.
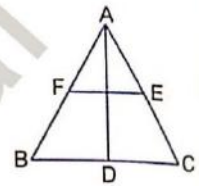 (iii) PSQR is a parallelogram.

Q. 36. By the graphical method, find different solutions of the linear equation $2x + 5y = 7$.

Or

Draw the graph of linear equation $2y = 3x + 1$.

Q. 37. In the given figure, $\triangle ABC$ is an isosceles triangle in which AB = AC and
D, E, F are the mid-points of BC, CA and AB respectively.
Show that AD $\perp$ FE and AD is bisected by FE.

Q. 38. A capsule is in the form of a cylinder with hemispherical ends. The total height of the capsule
is 19 mm and the diameter of the cylinder is 7 mm. Find the volume and surface area of the
capsule.

Or

Find the lateral curved surface area of a cylindrical petrol storage tank that is 4.2 m in diameter
and 4.5 m in height. How much steel was actually used, if $\dfrac{1}{10}$ of steel actually used was wasted
in making the closed tank ?

Q. 39. Construct a triangle ABC whose perimeter is 12 cm, $\angle B = 60°$ and $\angle C = 45°$.

Q. 40. An insurance company selected 2000 drivers at random (*i.e.*, without any preference of one
driver over another) in a particular city to find a relationship between age and accidents.
The data obtained are given in the table.

| Age of drivers (in years)	0	1	2	3	Over 3
15—25	125	165	105	60	25
26—50	500	404	65	23	18
Above 50	365	81	30	15	19

Find the probabilities of the following events for a driver chosen at random from the city :
  (i) Being 15—25 years of age and having exactly 3 accidents in one year.
  (ii) Being 26—50 years of age and having one or more accidents in a year.
 (iii) Having no accident in one year.

ANSWERS

1. (c) $\sqrt{4}$ 2. False   3. $\sqrt{5}$ 4. (a) 6   5. (d) 4   6. (d) fourth
7. (b) 122   8. (c) 1   9. (d) 107   10. (a) (5, –3)   11. 768 m²   12. True
13. (c) 80°   14. (d) 90°   15. parallel, half   16. 180°   17. True   18. $8x^3 + 27y^3$
19. 16500   20. (c) $\dfrac{-2}{3}$ 21. (i) (+, +)   (ii) (–, +)   (iii) (–, –)   (iv) (+, –)   22. 42
23. 60°, 120°   24. $21\sqrt{11}$ cm²   25. (i) $\angle P = 45°$, $\angle Q = 72°$, $\angle R = 135°$, $\angle S = 108°$ 26. (i) $\dfrac{63}{4}$ (ii) $\dfrac{3201}{400}$

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27. (i) $x^3 + y^3 + 8z^3 - 6xyz$ (ii) $8x^3 - y^3 + 27z^3 + 18xyz$ Or (i) 1   (ii) $\dfrac{-153}{65}$ **29.** 9504 cm^3 Or 1056 cm^2

30. 0.179, 0.150, 0.157, 0.149, 0.174, 0.191   **32.** (i) $\dfrac{203}{9}\sqrt{3}$ (ii) $\dfrac{3}{5}$

33. $b = 13, c = 35, d = 8, e = 5, f = 50$ and $g = 50$ **34.** ₹ 11.81

35. (i) 40° (ii) 40° (iii) 35° (iv) 65°

Or

36.

Or
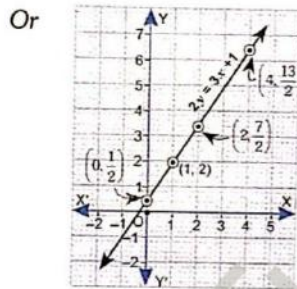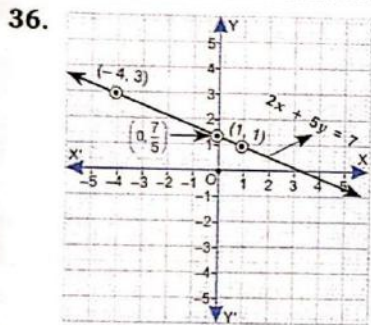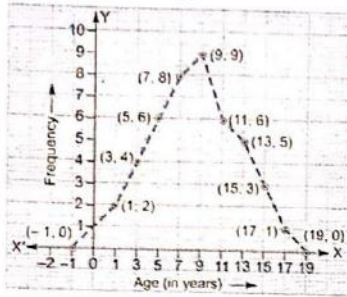
38. 641.67 mm^3, 418 mm^2 Or 59.4 m^2, 96.8 m^2 **39.**
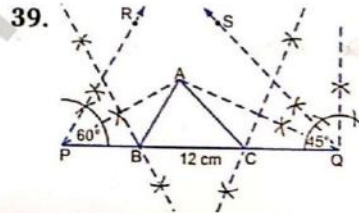
40. (i) 0.03   (ii) 0.255   (iii) 0.495

MODEL TEST PAPER–8

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. $\sqrt{625} + \sqrt{676}$ is equal to :

     (a) 51   (b) 61   (c) 71   (d) 91

Q. 2. Value of $\left(\sqrt{23} - \sqrt{11}\right)\left(\sqrt{23} + \sqrt{11}\right)$ is :

     (a) 10   (b) 12   (c) 14   (d) 16

Q. 3. 0.2 in the form $\frac{p}{q}$ may be written as :

(a) $\frac{1}{50}$ (b) $\frac{1}{5}$ (c) $\frac{2}{5}$ (d) $\frac{3}{5}$

Q. 4. Solution of the linear equations $3x + 2y = 12$ and $4x - 3y = -1$ is :

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

Q. 5. If $81x^2 - y^2 = \left(9x + \frac{1}{3}\right)\left(9x - \frac{1}{3}\right)$, then value of y is :

(a) 0   (b) 9   (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

Q. 6. Ordinate of the point $(-5, 0)$ is :

(a) -5 (b) 0   (c) 2   (d) 1

Q. 7. If $x - 2$ is a factor of $2x^2 + kx + 2$, then value of k is :

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

Q. 8. If $x - y = 10$ and $xy = 5$, then value of $x^2 + y^2$ is :

(a) 84   (b) 96   (c) 105   (d) 110

Q. 9. Value of 103^3 is :

(a) 1092727   (b) 1097272   (c) 1097722   (d) 1902727

Q. 10. The abscissa of every point on the y-axis is :

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

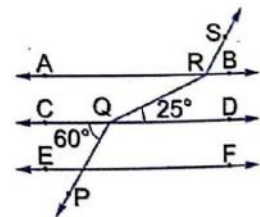**Q. 11.** State True or False :

Parallelograms on the same base and between the same parallels are equal in area.

Q. 12. Fill in the blank in the following statement :
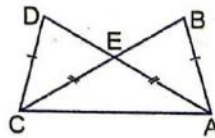
All diameters of a circle are concurrent at _____ .

Q. 13. In the given figure, if AB ‖ CD ‖ EF, PQ ‖ RS, $\angle RQD = 25°$ and $\angle CQP = 60°$, then $\angle QRS$ is equal to

(a) $85°$ (b) $135°$

(c) $145°$ (d) $110°$ [NCERT EXEMPLAR]

Q. 14. In figure, if $AB = CD$ and $AD = BC$, then show that $\triangle ADC \cong \triangle CBA$.

Q. 15. State True or False :

If the two diagonals of a parallelogram are equal, then the parallelogram is a rectangle.

Q. 16. Fill in the blank in the following statement :

If there are three parallel lines and the intercepts made by them on one transversal are equal, then the intercepts on other transversal are also _____ .

Q. 17. Two chords of a circle of lengths 12 cm and 10 cm are at the distances 10 cm and 4.5 cm respectively from the centre. Is, this true or false ?

Q. 18. Factorize $x^2 - 9x + 20$ using splitting the middle term.

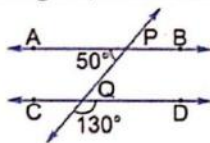**Q. 19.** If $p(x) = 3x^2 + 2x + 3$, find $p(\sqrt{3})$.

Q. 20. Find the value of y, when $x = -3$ in the linear equation $3x + 2y = 9$.

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. If $a - b = 6$ and $ab = 20$, then find the value of $a^3 - b^3$.

Q. 22. In the figure, show that AB || CD.

Q. 23. A cuboid has total surface area of 40 m² and its lateral surface area is 26 m². Find the area of its base.

Q. 24. If difference between two complementary angles is 40°, find the angles.

Q. 25. Write the quadrant in which the points (-3, 4) and (-2, -2) lie.

Q. 26. Fill in the blanks :

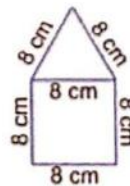(i) Decimal representation of $\frac{3}{4}$ is _____ .

(ii) Decimal representation of $\frac{22}{7}$ is _____ .

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Shyam made a picture of a building with coloured paper as shown in figure. Find the total area of the paper used.

Q. 28. The marks obtained out of 50 by 80 students in a Mathematics Test are given in the table below :

Marks	15	20	22	24	25	30	33	38	45
Number of students	5	8	7	16	12	18	7	3	4

Calculate the average marks.

Or

Following is the distribution of the marks of 25 students in a certain school test :

Marks	10	20	30	40	50
Number of students	4	9	17	20	25

(i) For the above data, form a frequency distribution. Also, find the number of students scoring more than 40 marks.
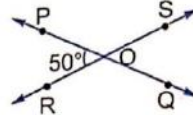
(ii) Represent this data by a histogram.

MTP—36

Q. 29. (i) In the figure, lines l_1 and l_2 intersect at O, forming angles as shown in the figure.
If $x = 45°$, find the values of y, z and u.
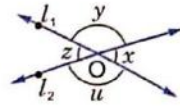
(ii) In the given figure, PQ and RS are two lines intersecting at O. If $\angle POR = 50°$, find $\angle QOS$, $\angle POS$ and $\angle QOR$.

Q. 30. Draw histogram to represent the following data :

| Class	0—49	50—99	100—149	150—199	200—249	250—299	300—349	350—399
Frequency	15	35	45	70	60	50	30	10

Q. 31. A square-shaped chess-board contains 64 equal squares and the area of each square is 6.25 cm². A border around (inside around) the board is 2 cm wide. Find the length of side of the chess-board.

Or

The length of the parallel sides of a trapezium are 60 m and 77 m respectively, and the lengths of other sides are 25 m and 26 m. Find the area of the trapezium.

Q. 32. In the given figure, X and Y are respectively two points on equal sides AB and AC of $\triangle ABC$ such that AX = AY.
Prove that CX = BY.
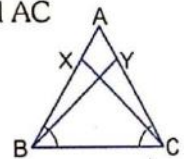
Or

Prove that the perimeter of triangle is greater than the sum of its three medians.

Q. 33. (i) If $x^2 + \dfrac{1}{x^2} = 51$, find the value of $x^3 - \dfrac{1}{x^3}$.

(ii) If $a + b + c = 9$ and $a^2 + b^2 + c^2 = 35$, find the value of $a^3 + b^3 + c^3 - 3abc$.

Or

Factorise each of the following expressions :

(i) $p^3 (q-r)^3 + q^3 (r-p)^3 + r^3 (p-q)^3$ 　　(ii) $a^3 + 3a^2b + 3ab^2 + b^3 - 8$

Q. 34. Simplify :

(i) $\dfrac{3^{-3} \times 6^2 \times \sqrt{98}}{5^2 \times \sqrt[3]{\dfrac{1}{25}} \times (15)^{-4/3} \times 3^{1/3}}$

(ii) $\dfrac{\sqrt{6}}{\sqrt{2}+\sqrt{3}} + \dfrac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}} - \dfrac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}$

Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. Construct a triangle ABC in which BC = 5.5 cm, AC – AB = 3.2 cm and $\angle ABC = 45°$.

Or

Construct a $\triangle XYZ$ with its perimeter 9.6 cm and base angles 45° and 60°.

Q. 36. The taxi fare in Lucknow is as follows : For the first kilometre, the fare is ₹ 8, for the subsequent distance it is ₹ 5 per km. Taking the distance covered as x km and total fare as ₹ y, Ayushree writes a linear equation for this information. What is the equation ?

Or

By the graphical method. find the solutions of the linear equation $2x + 3y = 11$.

Q. 37. Prove that the sum of either pair of opposite angles of a cyclic quadrilateral is $180°$.

Q. 38. Water flows at the rate of 10 m per minutes through a cylindrical pipe 5 mm in diameter. Ashok has a conical vessel having base diameter of 42 cm and depth of 24 cm. How long would it take to fill the conical vessel ?

Or

A measuring jar of internal diameter 10 cm is partially filled with water. Four equal spherical balls of diameter 2 cm each are dropped in it and they sink down in water completely. What will be the change in the level of water in the jar ?

Q. 39. In the given figure, PQ and RQ are chords of a circle equidistant from the centre. Prove that the diameter passing through Q bisects $\angle PQR$ and $\angle PSR$.

Q. 40. (i) The record of a weather station shows that out of the past 350 consecutive days, its weather forecasts were correct 275 times.
    (a) What is the probability that on a given day it was correct ?
    (b) What is the probability that it was not correct on a given day ?

   (ii) In an experiment, a coin is tossed 500 times. If the head turns up 280 times, find the empirical probability of getting :
    (a) a head   (b) a tail.

ANSWERS

1. (a) 51   2. (b) 12   3. (b) $\frac{1}{5}$ 4. (a) $x = 2, y = 3$ 5. (d) $\frac{1}{3}$ 6. (b) 0   7. (d) –5

8. (d) 110   9. (a) 1092727   10. (a) 0   11. True   12. Centre   13. (c) 145°   15. True

16. equal   17. False   18. $(x - 4)(x - 5)$ 19. $12 + 2\sqrt{3}$ 20. $y = 9$ 21. 576   23. 7 m²

24. 25°, 65°   25. Second quadrant, third quadrant   26. (i) 0.75   (ii) 3.142857   27. 91.71 cm²

28. 26.725 Or

29. (i) $y = 135°, z = 45°, u = 135°$
   (ii) $\angle QOS = 50°, \angle POS = 130°, \angle QOR = 130°$

30.
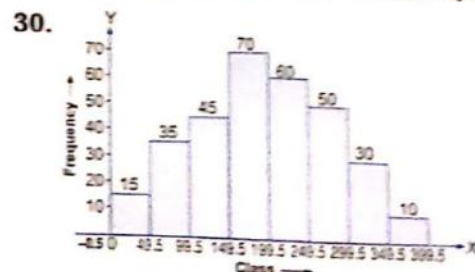
31. 24 cm Or 1644 m²   33. (i) 364 (ii) 108   Or   (i) $3pqr(q - r)(r - p)(p - q)$
                                                 (ii) $(a + b - 2)(a^2 + 2ab + b^2 + 2a + 2b + 4)$

34. (i) $28\sqrt{2}$ (ii) 0
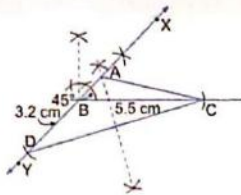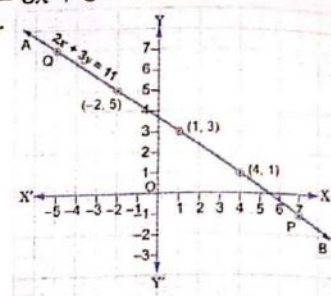
35. Or
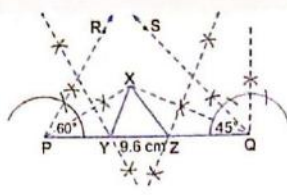
36. $y = 5x + 3$ Or

38. 56.5 minutes Or $\dfrac{16}{75}$ cm

40. (i) (a) 0.786   (b) 0.214

   (ii) (a) $\dfrac{14}{25}$ (b) $\dfrac{11}{25}$

MODEL TEST PAPER–9

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 $\dfrac{1}{\sqrt[3]{4^{-5}}}$ is equal to :

(a) $4.4^{2/3}$ (b) $4.4^{1/3}$ (c) $4^{1/3} \cdot 4^{1/5}$ (d) $4^{1/2} \cdot 4^{2/5}$

Q. 2. If $a = 3$ and $b = 2$ then value of $a^b + b^{2a}$ is equal to :

(a) 48   (b) 60   (c) 64   (d) 73

Q. 3. Write True or False :

$$(\sqrt{19} + \sqrt{5})(\sqrt{19} - \sqrt{5}) = 14$$

Q. 4. The product $(5x + 2y)(25x^2 - 10xy + 4y^2)$ is equal to :

(a) $125x^3 + 8y^3$ (b) $25x^3 + 2y^3$ (c) $125x^3 + 4y^3$ (d) $25x^3 + 8y^3$

Q. 5. Values of x and y which satisfy the equations $2x + y = 4$ and $3x - 2y = -1$ are :

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

Q. 6. The y-coordinate of the point origin is :

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

Q. 7. Value of x obtained by solving the linear equation $8x - 2 = 6$ is :

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

Q. 8. If $f(x) = \dfrac{2}{5}x^2 + \dfrac{5}{2}x + 1$, then $f(-2)$ is equal to :

(a) $\dfrac{5}{12}$ (b) $\dfrac{-12}{5}$ (c) $\dfrac{2}{9}$ (d) $\dfrac{-9}{2}$

Q. 9. Equation of line passing through the point $(0, 4)$ and parallel to x-axis is :

(a) $x = 4$ (b) $y + 4 = 0$ (c) $y = 4$ (d) $x + 4 = 0$

Q. 10. Area of a parallelogram having base 10 cm and height 5 cm is :

(a) 15 cm^2 (b) 50 cm^2 (c) 100 cm^2 (d) 25 cm^2

Q. 11. Fill in the blank in the following statement :
The point $(-1, -6)$ lies in _____ quadrant.

Q. 12. State True or False :
The centre of circle lies in the exterior of the circle.

Q. 13. Exterior angle of a triangle is $100°$ and interior opposite angles are equal. Measure of each of the equal angles of the triangle is :

(a) $10°$ (b) $100°$ (c) $30°$ (d) $50°$

Q. 14. The point of intersection of the bisectors of the internal angles of a triangle is called :

(a) incentre   (b) centroid   (c) orthocentre   (d) circumcentre

Q. 15. Write True of False :
The sum of lengths of any two sides of a triangle is less than the third side.

Q. 16. Sum of any pair of consecutive angles of a parallelogram is :

(a) $60°$ (b) $100°$ (c) $90°$ (d) $180°$

Q. 17. In $\triangle PQR$, if $\angle P = 80°$, and $PQ = PR$. Then, find the measure of $\angle R$.

Q. 18. Expand : $(\sqrt{3}x + 2y)^2$.

Q. 19. Write the factors of $9x^2 - (x + y)^2$.

Q. 20. State True or False :
$x = 3$, $y = -2$ is the solution of linear equation $3x + 4y = 1$.

Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Find the remainder by the long division method, where $p(x)$ to be divided by $q(x)$. Also check whether $q(x)$ is the factor of $p(x)$:
$$p(x) = 3x^2 + x - 1, \quad q(x) = x + 1$$

Q. 22. A transversal intersects two parallel lines. Prove that the bisectors of any pair of corresponding angles so formed are parallel.

Q. 23. Of the three angles of a triangle, one is twice the smallest one and another is three times the smallest one. Find the angles.

Q. 24. Find the cost of polishing the curved surface area of a right circular cylinder, whose diameter is 7 cm and height is 12 cm at 50 paise per cm^2.

Q. 25. Find the coordinate of the points :
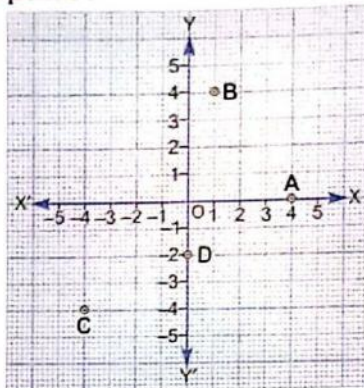
(i) A   (ii) B   (iii) C   (iv) D

Q. 26. Express each of the following recurring decimals in the form of $\dfrac{p}{q}$:

(i) $1.1\overline{27}$ (ii) $0.3\overline{578}$

Section C

Question number 27 to 34 carry 3 marks each.

**Q. 27.** Find the values of a and b from the following :

(i) $\dfrac{\sqrt{3}-1}{\sqrt{3}+1} + \dfrac{\sqrt{3}+1}{\sqrt{3}-1} = a + \sqrt{3}b$ (ii) $\dfrac{3+\sqrt{7}}{3-4\sqrt{7}} = a + b\sqrt{7}$

Q. 28. The taxi fare in a city is as follows : for the first kilometre, the fare is ₹ 6 and for the subsequent distance it is ₹ 5 per km. Taking the distance covered as x km and total fare as ₹ y, write a linear equation for this information and draw its graph.

Or

The autorikshaw fare in a city is charged ₹ 10 for the first kilometre and @ ₹ 4 per kilometre for subsequent distance covered. Write the linear equation to express the above statement. Draw the graph fot the linear equation.

Q. 29. In the given figure, AP and DP are the bisectors of two adjacent angles A and D of a quadrilateral ABCD.
Prove that $2\angle APD = \angle B + \angle C$.
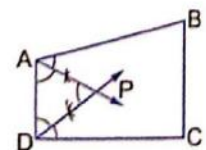
Or

Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

Q. 30. Lovely Sweet House was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger box is of dimensions 30 cm × 20 cm × 5 cm and the smaller box of dimensions 15 cm × 12 cm × 5 cm. For all the overlaps, 5% of the total surface area is required extra. If the cost of the cardboard is ₹ 5 for 1000 cm², find the cost of cardboard required for supplying 500 boxes of each kind.

Or

On Guru Nanak Jayanti S. Manjeet Singh wants to distribute milk in cylindrical vessels with radius 10 cm and height 15 cm to 350 people. Find the amount of milk distributed.

Q. 31. In the given figure, P is a point on the chord BC such that AB = AP.
Prove that CP = CQ.
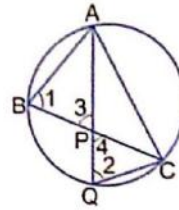
Q. 32. Over the past 200 working days, the number of defective parts produced by a machine is given in the following table :

Number of defective parts	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Days	50	32	22	18	12	12	10	10	10	8	6	6	2	2

Determine the probability that tomorrow's output will have

(i) no defective part.

(ii) atleast one defective part.

(iii) not more than 5 defective parts.   [NCERT EXEMPLAR]

Or

The record of a weather station shows that out of the past 150 consecutive days, its weather forecasts were correct 90 times :

(i) What is the probability that on a given day it was correct ?

(ii) What is the probability that it was not correct on a given day ?

Q. 33. Kapil wants to make a conical tent for his domestic animals. How many metres of cloth of 1.1 m width will be required to make a conical tent, whose vertical height is 12 m and base radius is 16 m. Also find the cost of the cloth used at the rate of ₹ 14 per metre.

Q. 34. In a city, the weekly observations made in a study on the cost of living index are given in the following table :

Cost of living index	Number of weeks
140—150	5
150—160	10
160—170	20
170—180	9
180—190	6
190—200	2
Total	52

Draw a frequency polygon for the above data.

Section D

Question numbers 35 to 40 carry 4 marks each.

Q. 35. Construct a triangle ABC in which BC = 7.5 cm, ∠ B = 75° and AB + AC = 12.5 cm.

Or

Construction a △ ABC whose perimeter is 15 cm and the base angles and 50° and 70°.

Q. 36. Using factor theorem, factorise the polynomial $2x^4 + x^3 - 14x^2 - 19x - 6$.

Or

In each of the following two polynomials, find the value of a, if $x + a$ is a factor :
  (i) $x^3 + ax^2 - 2x + a + 4$
  (ii) $x^4 - a^2x^2 + 3x - a$

Q. 37. Prove that the degree measure of an arc of a circle is twice the angle subtended by it at any point of the alternate segment of the circle with respect to the arc.

Q. 38. A hemispherical dome of a stupa needs to be painted (see figure). If the circumference of the base of the dome is 17.6 m, find the cost of painting it, if the cost of painting is ₹ 5 per 100 cm².
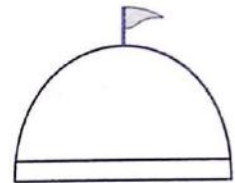
Or

A conical tent is 9 m high and the radius of its base is 12 m.
  (i) What is the cost of the canvas required to make it, if a square metre canvas costs ₹ 20 ?
  (ii) How many persons can be accommodated in the tent, if each person requires 2 square metres on the ground and 15 m³ of space to breadth in ?

Q. 39. PQRS is a quadrilateral in which diagonals PR and QS intersect at O. Show that :
 (i) PQ + QR + RS + SP > PR + QS
  (ii) PQ + QR + RS + SP < 2(PR + QS)

Q. 40. The following table presents the number of illiterate females in the age group (10—34) in a town :

| Age group	Number of females
10—14	400
15—19	980
20—24	800
25—29	580
30—34	200

Draw a histogram to represent the above data.

ANSWERS

1. (a) $4.4^{2/3}$ **2.** (d) 73 **3.** True **4.** (a) $125x^3 + 8y^3$ **5.** (c) $x = 1, y = 2$ **6.** (a) 0

7. (a) 1 **8.** (b) $\dfrac{-12}{5}$ **9.** (c) $y = 4$ **10.** (b) 50 cm^2 **11.** third **12.** False **13.** (d) 50°

14. (a) incentre **15.** False **16.** (d) 180° **17.** 50° **18.** $3x^2 + 4\sqrt{3}xy + 4y^2$ **19.** $(4x + y)(2x - y)$

20. True **21.** remainder = 1, $q(x)$ is not the factor of $p(x)$ **23.** 30°, 60° and 90° **24.** ₹ 132

25. (i) A(4, 0) (ii) B(1, 4) (iii) C(−4, −4) (iv) D(0, −2) **26.** (i) $\dfrac{62}{55}$ (ii) $\dfrac{715}{1998}$

27. (i) $a = 4, b = 0$ (ii) $a = \dfrac{-37}{103}$, $b = \dfrac{-15}{103}$
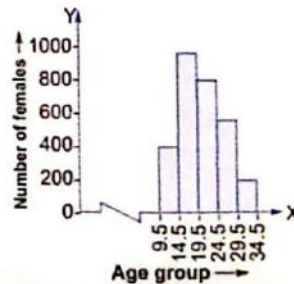
28. $y = 1 + 5x$

Or

$y = 4x + 6$
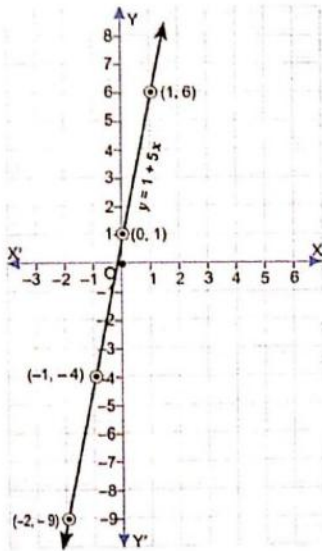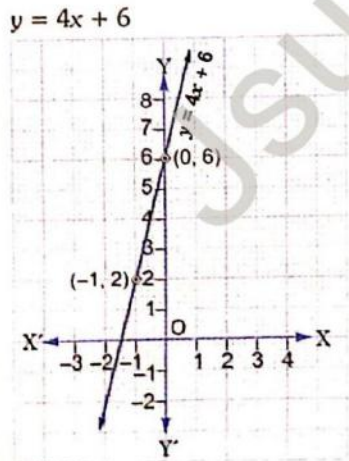
30. ₹ 6116.25 *Or* 1650 litres

32. (i) 0.25 (ii) 0.75 (iii) 0.73 *Or* (i) 0.6 (ii) 0.4

33. $\dfrac{6400}{7}$ m, ₹ 12,800

34.

35.

  Or
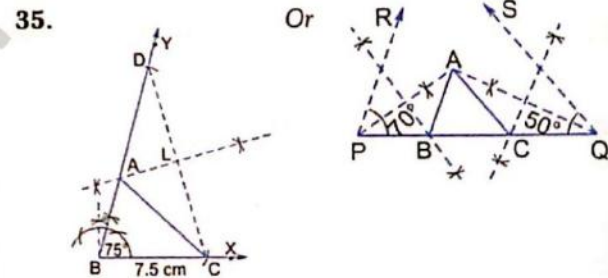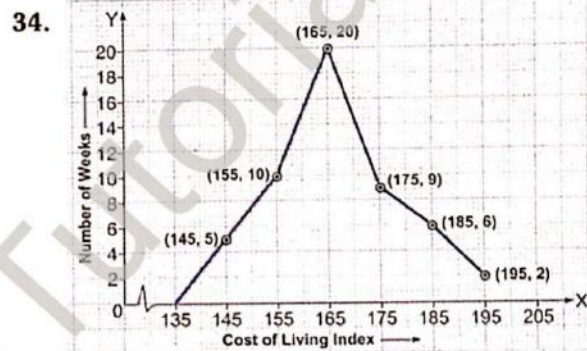
36. $(x + 1)(x + 2)(x - 3)(2x + 1$ *Or* (i) $-\dfrac{4}{3}$ (ii) 0

38. ₹ 24640 *Or* (i) ₹ 11314 (ii) 91 persons

40.

MODEL TEST PAPER–10

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. $\left(\sqrt{7}\right)^2 \times \left(\sqrt{7}\right)^{-3}$ is equal to :

(a) $\dfrac{1}{49}$ (b) $\dfrac{1}{\left(\sqrt{7}\right)^3}$ (c) $\dfrac{1}{7}$ (d) $\dfrac{1}{\sqrt{7}}$

Q. 2. $\left(\dfrac{81}{256}\right)^{3/4}$ is equal to :

(a) $\dfrac{27}{64}$ (b) $\dfrac{128}{27}$ (c) $\dfrac{16}{9}$ (d) $\dfrac{4}{3}$

Q. 3. Write True or False :

$\dfrac{p}{q}$ form of $0.\overline{418}$ is $\dfrac{23}{50}$.

Q. 4. Which of the following is not the factor of polynomial $p(x) = x^3 - 3x^2 - 10x + 24$?

(a) $x - 2$ (b) $x + 3$ (c) $x - 4$ (d) $x + 1$

Q. 5. $x = 6, y = 1$ is the solution of which of the following linear equations ?

(a) $4x + y = 20$ (b) $7x - y = 2$ (c) $2x + 3y = 15$ (d) $6x + 2y = 45$

Q. 6. Sum of the number 2 and the ordinate of the point $(3, -8)$ is :

(a) -6 (b) 10 (c) -10 (d) 16

Q. 7. If $7y - 9 = 0$ then $\dfrac{2y}{3}$ is equal to :

(a) $\dfrac{12}{5}$ (b) $\dfrac{6}{7}$ (c) $\dfrac{3}{8}$ (d) $\dfrac{2}{5}$

Q. 8. If $x - a$ is a factor of $-x^3 + ax^2 + x + 5$, then value of a is :

(a) -2 (b) -3 (c) -5 (d) -6

Q. 9. Point at which the line $3x + y = 5$ meets the x-axis is :

(a) $\left(\dfrac{5}{3}, 0\right)$ (b) $\left(\dfrac{3}{5}, 0\right)$ (c) $\left(0, \dfrac{5}{3}\right)$ (d) $(5, 0)$

Q. 10. Area of triangle is 140 cm². If height of the triangle is 20 cm, then base of the triangle is :

(a) 11 cm   (b) 12 cm   (c) 13 cm   (d) 14 cm

Q. 11. Fill in the blank in the following statement :

The point $(-5, 0)$ lies on _____ axis.

Q. 12. State True or False :

Of any two chords of a circle, the one which is longer is nearer to the centre.

Q. 13. Centroid of a triangle divides the medians in the ratio :

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

Q. 14. Fill in the blank in the following statement :

The right bisectors of the sides of a triangle are _____ .

Q. 15. Write True or False :

Orthocentre is the point at which the medians of a triangle meet.

Q. 16. Three angles of a quadrilateral are 36°, 60° and 108°. Fourth angle is equal to :

(a) 156°   (b) 160°   (c) 164°   (d) 170°

Q. 17. In the given figure, $\angle$ POR and $\angle$ QOR form a linear pair. If $a - b = 80°$, then find the value of a and b.
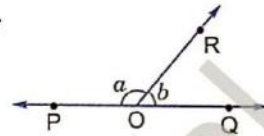
Q. 18. Evaluate : $(15)^3 + (5)^3 - (20)^3$.

Q. 19. Verify whether $t = 0$ and $t = 4$ are zeroes of the polynomial $t^2 - 4t$.

Q. 20. State True or False :

The equation $3x + \dfrac{2}{x} = 1$ is a linear equation in one variable.
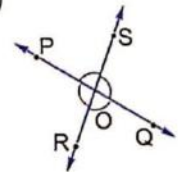
Section B

Question number 21 to 26 carry 2 marks each.

Q. 21. Find the simplest form of $\left(\dfrac{81}{16}\right)^{-3/4} \times \left[\left(\dfrac{25}{9}\right)^{-3/2} \div \left(\dfrac{5}{2}\right)^{-3}\right]$.

Q. 22. Plot the following points on the graph paper :

(i) $(2, 5)$ (ii) $(4, -3)$ (iii) $(-5, -3)$ (iv) $(-3, 4)$

Q. 23. In the given figure, lines PQ and RS intersect each other at point O. If $\angle$ POR : $\angle$ ROQ = 5 : 4, find all the angles.

Q. 24. The perimeter of a rhombus is 20 cm. If one of its diagonals is 8 cm, then find the area of the rhombus.

Q. 25. Abhilasha has drawn a quadrilateral PQRS in which vertices P, Q, R and S are $(1, 4)$, $(-5, 4)$, $(-5, -3)$ and $(1, 3)$ respectively. What type of quadrilateral is formed ?

Q. 26. The sum of three consecutive odd natural numbers is 135. Find the numbers.

Section C

Question number 27 to 34 carry 3 marks each.

Q. 27. Find three different solutions of equation $3x + 2y = 6$.

Or

Draw the graph of the equation $3x - 2y = 4$. Find the coordinates of the point where the graph cuts the x-axis.

Q. 28. In the given figure, EA ∥ BC and ABC is a right triangle drawn in which ∠B = 90°, BC is base and ∠ACB = 30°. A line from B is drawn to meet AC at D so that DB = DC. Find the values of p, q, r.
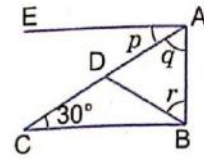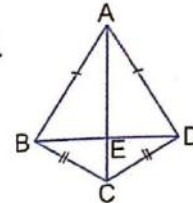
Or

If figure, ABCD is a quadrilateral in which AB = AD and BC = DC.

Prove that :

(i) AC bisects each of the angles A and C.

(ii) BE = DE

(iii) ∠ABC = ∠ADC

Q. 29. In exchange for a square plot of land, one of whose sides is 84 m, a man wants to buy a rectangular plot 144 m long and of the same area as the square plot. Determine the width of the rectangular plot.

Or

Diagonal of a parallelogram-shaped field is 42 m. The perpendicular distance of this diagonal from vertex is 10 m. Find the cost of watering the field at the rate of ₹10 per 100 m².

Q. 30. The class-marks of various class intervals and their frequencies are as under :

Class-mark	10	15	20	25	30	35	40
Frequency	3	9	15	14	30	18	11

Construct the frequency table and the cumulative frequency table.

Q. 31. In a △ ABC, side AB is produced to D so that BD = BC. If ∠B = 60° and ∠A = 70°, prove that :

(i) AD > CD (ii) AD > AC

Q. 32. Simplify :

(i) $\dfrac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \dfrac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \dfrac{2\sqrt{3}}{\sqrt{6}+2}$

(ii) $\dfrac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 4^{\frac{1}{4}}}{10^{-\frac{1}{5}} \times 5^{\frac{3}{5}}} \div \dfrac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{4^{\frac{-3}{5}} \times 6}$

Q. 33. Find the missing frequencies in the following frequency distribution, if it is known that the mean of the distribution is 1.46.

Number of accidents (x)	0	1	2	3	4	5	Total
Frequency (f)	46	f_1	f_2	25	10	5	200

Or

Draw a histogram and a frequency polygon to represent the following data :

Weekly weges (in ₹)	850—950	950—1050	1050—1150	1150—1250	1250—1350
Number of workers	55	40	65	55	40

Q. 34. A tent is in the shape of a right circular cylinder upto a height of 6 metres and then becomes a right circular cone with a maximum height of 16.5 metres above the ground. Calculate the cost of painting the inner side of the tent at the rate of ₹ 3 per square metre, if the radius of the base is 14 metres.

Section D

Question number 35 to 40 carry 4 marks each.

Q. 35. Construct a △ ABC in which BC = 6 cm, ∠ B = 60° and the sum of other two sides is 9 cm.

Or

Construct a △ ABC, given that ∠B = 60°, ∠C = 45° and AB + BC + CA = 12 cm.

Q. 36. (i) If $a + b = 10$ and $a^2 + b^2 = 58$, find the value of $a^3 + b^3$.

(ii) If $x + \dfrac{1}{x} = \sqrt{5}$, find the values of $x^2 + \dfrac{1}{x^2}$ and $x^4 + \dfrac{1}{x^4}$.

Or

Let R_1 and R_2 are the remainders when the polynomials $x^3 + 2x^2 - 5ax - 7$ and $x^3 + ax^2 - 12x + 6$ are divided by $x + 1$ and $x - 2$ respectively. If $2R_1 + 3R_2 = 2$, find the value of a.

Q. 37. Prove that triangles on the same base and between the same parallels are equal in area.

Q. 38. The internal and external diameters of a hollow hemi-spherical vessel of Riya are 24 cm and 25 cm respectively. The cost of paint one sq. cm of the surface is 7 paise. Find the total cost to paint the vessel all over (ignore the area of edge).

Or

A right-angled triangle of which the sides containing the right angle are 6.3 cm and 10 cm in length, is made to turn round on the longer side. Find the volume of the solid thus generated. Also, find its curved surface area.

Q. 39. Prove that the median drawn to the hypotenuse of a right-angled triangle is half of the hypotenuse.

Q. 40. The distance (in km) of 40 female engineers from their residence to their place of work were found as follows :

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	2

Find the probability that an engineer lives :
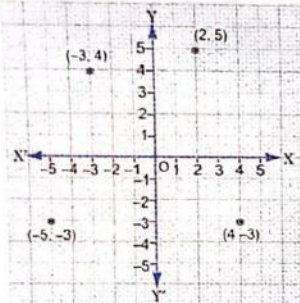
(i) less than 8 km from her place of work ?

(ii) at least 7 km from her place of work ?

(iii) at most 15 km from her place of work ?

ANSWERS

1. (d) $\dfrac{1}{\sqrt{7}}$ **2.** (a) $\dfrac{27}{64}$ **3.** False   **4.** (d) $x + 1$ **5.** (c) $2x + 3y = 15$ **6.** (a) –6   **7.** (b) $\dfrac{6}{7}$

8. (c) –5   **9.** (a) $\left(\dfrac{5}{3}, 0\right)$ **10.** 14 cm   **11.** x **12.** True   **13.** (b) 2:1   **14.** concurrent

15. False   **16.** (a) 156°   **17.** $a = 130°, b = 50°$ **18.** –4500   **19.** yes   **20.** False   **21.** 1
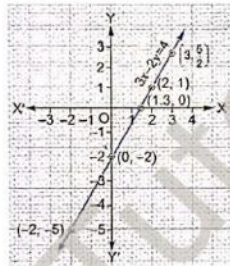
22.

23. $\angle POR = \angle SOQ = 100°$
$\angle ROQ = \angle POS = 80°$

24. 24 cm^2 **25.** Rectangle   **26.** 43, 45, 47

27. $(0, 3)$, $\left(1, \dfrac{3}{2}\right)$, $(2, 0)$

     Or

The graph cuts the
x-axis at $(1.3, 0)$

28. $p = 30°, q = 60°, r = 60°$
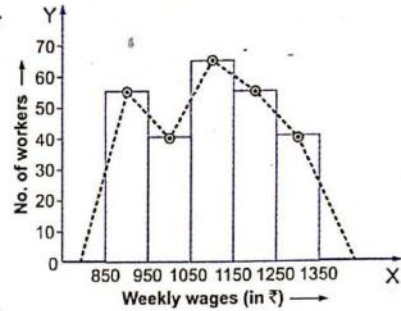
29. 49 m *Or* ₹ 42

30.

Class-Interval	Frequency	Cumulative Frequency
7.5—12.5	3	3
12.5—17.5	9	12
17.5—22.5	15	27
22.5—27.5	14	41
27.5—32.5	30	71
32.5—37.5	18	89
37.5—42.5	11	100
Total	100	

32. (i) 0   (ii) 10

33. $f_1 = 76, f_2 = 38$

   Or

34. ₹ 3894

35.

   Or
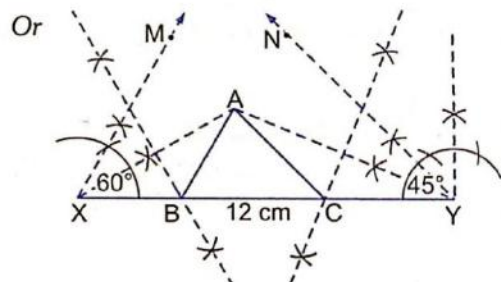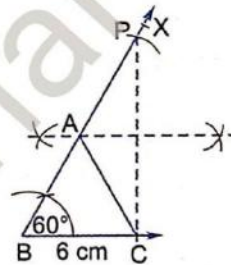
36. (i) 370   (ii) $x^2 + \dfrac{1}{x^2} = 3$, $x^4 + \dfrac{1}{x^4} = 7$

     Or

   $a = 2$

38. ₹ 132.11 *Or* 415.8 cm³, 234.03 cm²

40. (i) 0.35   (ii) 0.75   (iii) 0.75

■ ■ ■