CLASS IX

Session- 2022-23

Subject-Mathematics

Sample Question Paper 1

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

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section **A** has 20 MCQs carrying 1 mark each
3. Section **B** has 5 questions carrying 02 marks each.
4. Section **C** has 6 questions carrying 03 marks each.
5. Section **D** has 4 questions carrying 05 marks each.
6. Section **E** has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION A

Section A consists of 20 questions of 1 mark each.

1. The value of 1.999….in the form of p/q where p and q are integers is
   (a) $\frac{19}{10}$ (b) $\frac{1999}{1000}$ (c) 2 (d) $\frac{1}{9}$
2. The product of any two irrational numbers is
   (a) always an irrational number (b) always a rational number (c) always an integer (d) sometimes rational, sometimes irrational
3. If p(x) = x + 3, then p(x) + p(-x) is equal to
   (a)3 (b) 20 (c) 0 (d) 6
4. What is the ordinate of the points that lie on the x-axis
   (a) -1 (b) 0 (c) 1 (d) 2
5. The equation x = 7 , in two variables, can be written as
   (a) 1.x+1.y = 7 (b) 1.x+0.y =7 (c) 0.x+1.y =7 (d) 0.x+0.y =7
6. x = 5, y = 2 is a solution of the linear equation
   (a) x + 2y = 7 (b) 5x + 2y = 7 (c) x + y = 7 (d) 5x + y =7
7. The graph of the linear equation 2x + 3y = 6 cuts the y-axis at the point
   (a) (2,0) (b) (0,3) (c) (3,0) (d) (0,2)
8. In Δ ABC, BC = AB and ∠ B = 80^0. Then ∠A is equal to
   (a) 80^0 (b)40^0 (c) 50^0 (d)100^0
9. Name the figure obtained by joining the mid-points of the sides of a rhombus, taken in order.
   (a) a rhombus (b) a rectangle (c) a square (d) any parallelogram
10. The sides of a triangle are 56 cm, 60 cm and 52 cm. What is the area of the triangle.
    (a) 1322 cm^2 (b) 1311 cm^2 (c) 1344 cm^2 (d) 1392 cm^2

11. What is the length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm^2.

(a) 8 cm (b) 36 cm (c) 4 cm (d) 6 cm

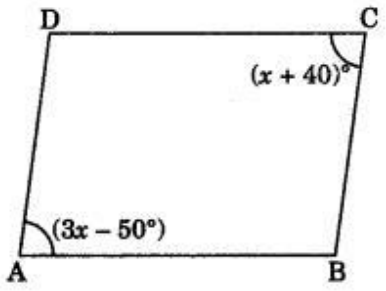
12.The edges of a triangular board are 6 cm, 8 cm and 10 cm. what is the cost painting it at the rate of 9 paise per cm2.

(a) Rs 2 (b) Rs 2.16 (c) Rs 2.48 (d) Rs 3.00

13.In the given figure, the ratio ∠ ABD : $\angle ACD$ is

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

14.In the given figure, ABCD is a parallelogram. Find the value of x



(a) 25^0 (b) 75^0 (c) 60^0 (d) 45^0

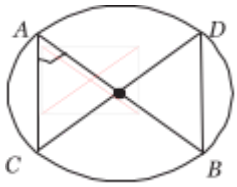
15. If the class marks in a frequency distribution are 19.5,26.5,33,5,40.5 then the class corresponding to the class mark 33.5 is

(a) 16-23 (b) 23-30 (c) 30-37 (d) 37-41

16. If the volume and total surface area of a hemisphere is numerically equal, then its diameter is

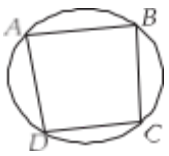
(a) 2 units (b) 3 units (c) 9 units (d) 5 units

17. In the given figure, O is the centre of a circle. If $\angle OAC = 49°$, then ∠ ODB



(a) 40° (b) 49° (c) 60° (d) 75°

18. In a cyclic quadrilateral $ABCD$, if $\angle A = 3\angle C$.
Find $\angle A$.



(a) 40° (b) 45° (c) 60° (d) 75°

19**. DIRECTION:** In the question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**.
Choose the correct option

Statement A (Assertion): If the radius of a sphere is tripled, then the ratio of the volume of the original sphere to that of the new is 1:27

Statement R(Reason) **:** Volume of a sphere with radius r is $\frac{4}{3}\pi r^3$

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

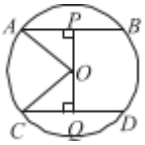
(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)

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

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

20. ***Statement A (Assertion):*** In the given figure, *O* is the centre of the circle of radius 5 cm. If $OP \perp AB$, $OQ \perp CD$, $AB \parallel CD$, $AB = 6$ cm and $CD = 8$ cm, then $PQ = 6$ cm.

Reason : Perpendicular bisectors of two chords of a circle intersect at its centre.



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

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

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

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

SECTION B

Section B consists of 5 questions of 2 marks each.

21. If $a + b = 12$ and $ab = 27$, then find $a^3 + b^3$

22. Write any two solutions of the equation $2x + y = 7$

23.In the given figure, if AB = CD, then prove that AC = BD. Also, write the Euclid's axiom used for proving it.



24. The volume of a cone with a circular base is 216π cm^3. If the base radius is 9 cm, then find the height of the cone.

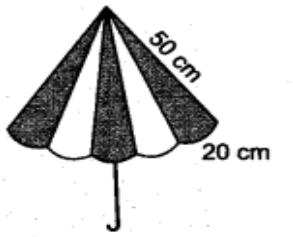
OR

Find the radius of the sphere whose surface area is 154 cm^2

25. The sides of a triangle are in the ratio 3:5:7 and its perimeter is 300 m. Find its area.

OR

An umbrella is made by stitching 10 triangular pieces of cloth of two different colours, each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?



SECTION C

Section C consists of 6 questions of 3 marks each.

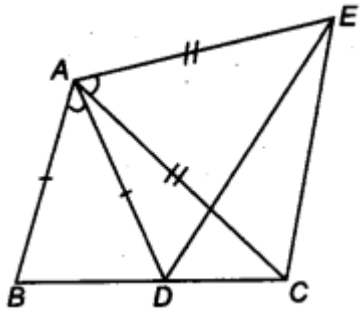
26. Give the geometrical representation of 5x+2 =0 in

(i) one variable

(ii) two variables

27**.** Plot the points A(-1, 1), B(5, 1), C(5, 6) and D(-1, 6)in the Cartesian plane. Identify the figure ABCD. Find its area.

28. In figure, AC = AE, AB = AD and ∠BAD = ∠EAC. Show that BC = DE.

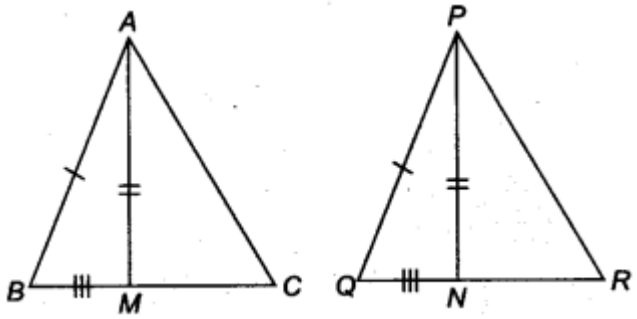


OR

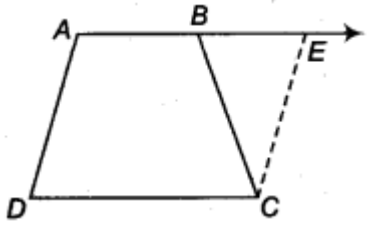
Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and OR and median PN of ΔPQR. Show that

(i) ΔABC ≅ ΔPQR

(ii) ΔABM ≅ ΔPQN



29. ABCD is a trapezium in which AB || CD and AD = BC . Show that
(i)∠A=∠B
(ii)∠C=∠D
(iii) ΔABC ≅ ΔBAD
(iv) diagonal AC = diagonal BD



30. If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.

OR

If the non – parallel sides of a trapezium are equal, prove that it is cyclic.

31. If $x = 9 - 4\sqrt{5}$ find $x^2 - \frac{1}{x^2}$

SECTION D

Section D consists of 4 questions of 5 marks each.

32. Given that $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + \sqrt{5}\, b$

Find the values of a and b.

33. Factorise $x^3 - 6x^2 + 11x - 6$

OR

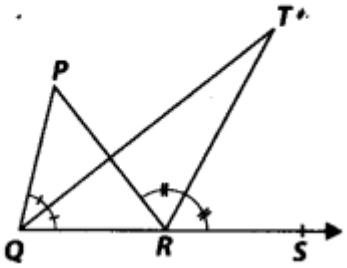
The polynomials $ax^3 - 3x^2 + 4$ and $2x^3 - 5x + a$, when divided by (x -2), leave the remainders p and q respectively. If p – 2q = 4, find the value of a.

34. If in ΔABC, the bisectors of ∠B and ∠C intersect each other at O. Prove that $\angle BOC = 90° + \frac{1}{2}\angle A$.

OR

In figure, the side QR of ΔPQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that

$\angle QTR = \frac{1}{2}\angle QPR.$



35. The following table gives the distribution of students of two sections according to the marks obtained by them

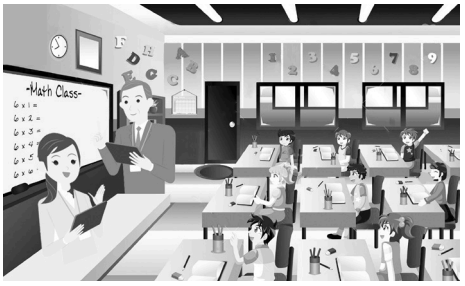
Section *A*		Section *B*	
Marks	**Frequency**	**Marks**	**Frequency**
0 - 10	3	0 - 10	5
10 - 20	9	10 - 20	19
20 - 30	17	20 - 30	15
30 - 40	12	30 - 40	10
40 - 50	9	40 - 50	1

Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the two polygons compare the performance of the two sections.

SECTION E

Case study based questions are compulsory.

36. On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.



(i) What is the name of the polynomial of the type $ax^2 + bx + c$, $a = 0$ (1 mark)

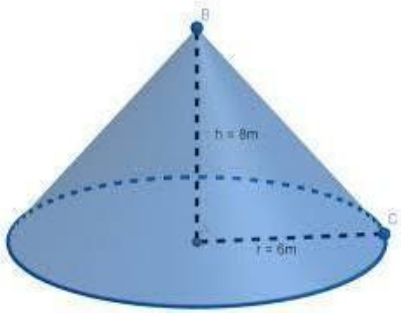
(ii) What is the value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$ (2 marks)

OR

What is the value of a if $x + 2$ is the factor of $x^3 - 2ax^2 + 16$.

(iii) What is the degree of the polynomial $(y^3 - 3)(y^2 + 8)$ (1 mark)

37. Once four friends Rahul, Arun, Ajay, and Vijay went for a picnic at a hill station. 'Due to peak season, they did not get a proper Hotel in the city. The weather was fine so they decided to make a conical tent at a park. They were carrying 200 sq.m cloth with them. They made the conical tent with a height of 8m and a diameter of 12m. The remaining cloth was used for the floor.



i) What is the slant height of the tent? (1 mark)

ii) How much cloth was used for the floor? (2 marks)

OR

What was the total surface area of the tent.

iii) What was the volume of the tent. (1 mark)

38. During Maths lab activity, teacher give four sticks of lengths 6 cm,6 cm, 4 cm, 4 cm to each student to make different types of quadrilateral

A B

C D

(i) How many triangles a diagonal of parallelogram divide it. (1 mark)

(ii)A student form a rectangle with sticks. What is the length of the diagonal of the rectangle formed by the student. (2 marks)

OR

How many types of quadrilaterals can be possible.

(iii) If angles of a quadrilateral are in ratio 3 : 5 : 5 : 7, then find all the angles. (1 mark)

CLASS IX

Session- 2022-23

Subject- Mathematics

Sample Question Paper 2

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

General Instructions:

1. **This Question Paper has 5 Sections A-E.**
2. **Section A has 20 MCQs carrying 1 mark each**
3. **Section B has 5 questions carrying 02 marks each.**
4. **Section C has 6 questions carrying 03 marks each.**
5. **Section D has 4 questions carrying 05 marks each.**
6. **Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.**

7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E

Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

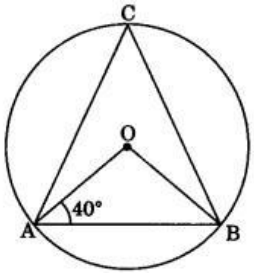
SECTION A

Section A consists of 20 questions of 1 mark each.

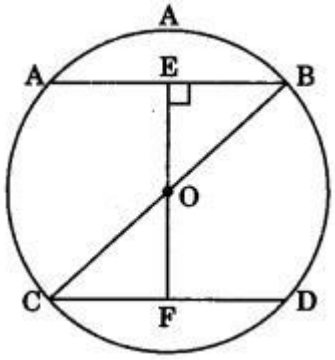
1. If p(x) = x^2+ kx + 6, then for what value of k, if p(3) = 0
   (a) 2 (b) –5 (c) 3 (d) – 1
2. An irrational number between $\frac{5}{7}$ and $\frac{7}{9}$ is
   (a)0.75 (b) $\sqrt{6}$ (c) 0.750750075000….. (d) 0.7512
3. $(5 + \sqrt{5})(5 - \sqrt{5})$ on simplification gives
   (a) 20 (b)$2\sqrt{5}$ (c) 10 (d)25
4. Point P(2,-3) lies on the line represented by the equation
   (a)x + 2y =0 (b) $2x + 2y = 0$ (c) $x + y = 1$ (d) 2x+y=1
5. The distance of a point (0,-3) from the origin is :
   (a) 0 units (b) -3 units (c) cannot be determined (d) 3 units
6. x = 5, y = -2 is the solution of linear equation
   (a) 2x + y = 9 (b) x + 3y =1 (c) 2x- y = 12 (d) x – 3y = 0
7. The linear equation has 2x + 5y = 8 has
   (a) two solution (b) a unique solution (c) no solution (d) infinitely many solutions
8. In a Δ ABC, if $\angle A - \angle B = 42^0$ and $\angle B - \angle C = 21^0$ then find $\angle B$
   (a) 53^0 (b) 63^0 (c) 42^0 (d) 72^0
9. The angles in a quadrilateral are in the ratio 2 :3: 6:7. The largest angle of the quadrilateral is:
   (a)40^0 (b)120^0 (c)140^0 (d) 160^0
10. The diagonals AC and BD of a || gm ABCD intersect each other at the point O. If ∠DAC = 32° and ∠AOB = 70°, then ∠DBC is equal to

    (a) 24° (b) 86° (c) 38° (d) 32°

11. In the given figure, O is the centre of a circle. If ∠OAB = 40° and C is a point on the circle, then ∠ACB =

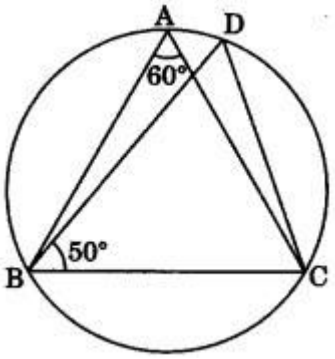


    a) 40^0 (b) 50^0 (c) 80^0 (d) 100^0
12. In the given figure, BOC is a diameter of a circle with centre O. If AB and CD are two chords such that AB || CD and AB = 10 cm, then CD =



(a) 5 cm (b) 12.5 cm (c) 15 cm (d) 10 cm

13. In the given figure, ΔABC and ΔDBC are inscribed in a circle such that ∠BAC = 60° and ∠DBC = 50°. then, ∠BCD =



(a) 50° (b) 60^0 (c) 70° (d) 80°

14. The perimeter of an equilateral triangle is 60 m. The area is
(a) $10\sqrt{3}$ m² (b) $15\sqrt{3}$ m² (c) $20\sqrt{3}$ m² (d) $100\sqrt{3}$ m²

15. An isosceles right triangle has area 8 cm². The length of its hypotenuse is
(a) $\sqrt{32}$cm (b) $\sqrt{16}$ cm (c) $\sqrt{48}$cm (d) $\sqrt{24}$cm

16. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratios of the surface areas of the balloon in the two cases is
(a) 1 : 4 (b) 1 : 3 (c) 2 : 3 (d) 2 : 1

17. If the radius of a sphere is doubled, then what is the ratio of their surface area?
(a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1

18. Histogram graphically represent the grouped frequency distribution with
(a)upper limits of the classes (b)continuous classes (c)discontinuous classes (d)Maximum frequency

DIRECTION: In the question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**.
Choose the correct option

19. Statement A (Assertion): The sides of a triangle are 3 cm,4cm,5cm and area is 6 cm^2
Reason: If 2s = (a +b +c) where a, b, c are the sides of a triangle, then area = $\sqrt{(s-a)(s-b)(s-c)}$

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

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

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

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

20. Statement A (Assertion): In $\Delta ABC, AB = AC and \angle B = 50^0$, then $\angle C = 50^0$
Reason: In a triangle, angle opposite to equal sides are equal.

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

explanation of assertion (A)

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

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

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

SECTION B

Section B consists of 5 questions of 2 marks each.

21. Find the value of m, if x + 4 is a factor of the polynomial $x^2 + 3x + m$.
22. Find any two solutions of 2x + y = x + 5
23. If a point C lies between two points A and B such that AC = BC, then prove that AC = 1/2 AB, explain by drawing the figure.
24. Find the area of a triangle whose sides are 11 m, 60 m and 61 m.

OR

Find the area of an isosceles triangle whose base is 16 cm and one of its equal sides is 10 cm.

25. Find the total surface area of a hemisphere of radius 10 cm. (Use $\pi = 3.14$)

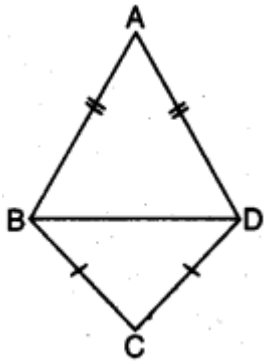
OR

Calculate the height of a cone whose slant height is 25 cm and curved surface area is 550 cm^2.

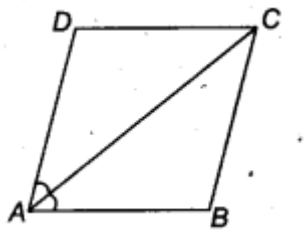
SECTION C

Section C consists of 6 questions of 3 marks each.

26. Express 1.8181… in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.
27. Plot the following points, join them in order and identify the figure thus formed: A(1, 3), B(1, -1), C(7, -1) and D(7, 3)
28. Express y in terms of x for the equation 3x – 4y + 7 = 0. Check whether the points (23, 4) and $(0,\frac{7}{4})$ lie on the graph of this equation or not.
29. In the given figure, ΔABD and ABCD are isosceles triangles on the same base BD. Prove that ∠ABC = ∠ADC.

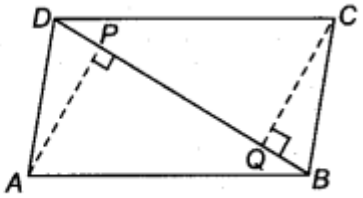


30. Diagonal AC of a parallelogram ABCD bisects ∠A (see figure). Show that
(i) it bisects ∠C also,
(ii) ABCD is a rhombus.



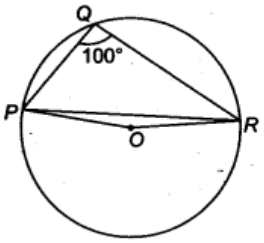
OR

ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD (see figure). Show that



(i) $\Delta APB \cong \Delta CQD$ (ii) $AP = CQ$.

31. In figure, ∠PQR = 100°, where P, Q and R are points on a circle with centre O. Find ∠OPR.



OR

Prove that a cyclic parallelogram is a rectangle.

SECTION D

Section D consists of 4 questions of 5 marks each.

32. Find a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by the polynomials (x – 1) and (x – 2)

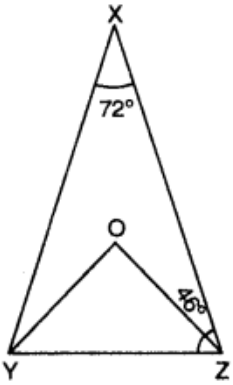
OR

Factorise: $x^3 - 12x^2 + 47x - 60$.

33. If two parallel lines are intersected by a transversal, prove that the bisectors of two pairs of interior angles form a rectangle.

OR

In the figure, ∠X = 72°, ∠XZY = 46°. If YO and ZO are bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OYZ and ∠YOZ.



34. A random survey of the number of children of various age groups playing in a park was found as follows:

Age(in years)	Number of children

1- 2	5
2 – 3	3
3 – 5	6
5 – 7	12
7 – 10	9
10 – 15	10
15 – 17	4

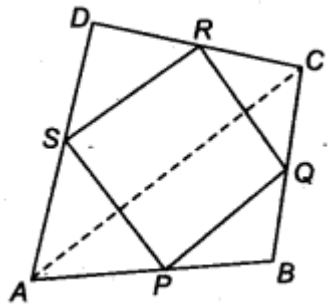
Draw a histogram to represent the data above.

35. If a = 1 - $\sqrt{2}$ find (a - $\frac{1}{a}$)^3

SECTION E

Case study based questions are compulsory.

36. Maths teacher of class 9th gave students coloured paper in the shape of quadrilateral and then ask the students to make parallelogram from it.



a. If $\angle RSP = 30^0$ then find ∠RQP (1mark)

b. If ∠RSP = 50^0 then $\angle SPQ$ (2 marks)

OR

Write two properties of parallelogram

c. If SP = 3cm then what is RQ (1 mark)

37. The National Service Scheme (NSS) is an Indian government-sponsored public service program that aimed at developing student's personality through community service. The volunteers of NSS erected a conical tent made of tarpaulin in a flood affected area. If vertical height and diameter of the conical tent are 3m and 8m, respectively and the width of tarpaulin is 250cm, then answer the following.

(i).What is the slant height of the conical tent. (1 mark)

(ii) What is the area of the tarpaulin used (2 marks)

OR

What is the length of the tarpaulin used

(iii) What is the formula to calculate the curved surface of a cone. (1 mark)

38. If Beti Bachao, Beti Padhao (BBBP) is a personal campaign of the Government of India that aims to generate awareness and improve the efficiency of welfare services intended for girls.



In a school, a group of $(x + y)$ teachers, $(x^2 + y^2)$ girls and $(x^3 + y^3)$ boys organised a campaign on Beti Bachao, Beti Padhao.

a. Which mathematical concept is used here. (1 mark)
b. If in the group there are 10 teachers and 58 girls, then what is the number of boys.

OR

Find $(x^2 – y^2)$ if $x – y = 23$. (2 marks)
c. Find the value of $249^2 – 248^2$. (1 mark)

CLASS IX

Session- 2022-23

Subject- Mathematics

Sample Question Paper 3

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

General Instructions:

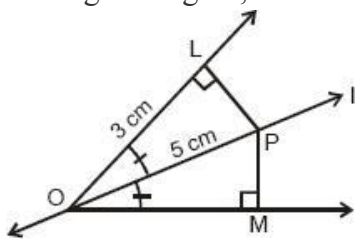
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E

Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION A

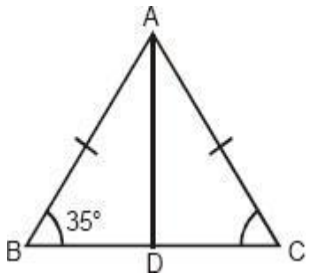
Section A consists of 20 questions of 1 mark each.

1. Find the value of $x^3 + y^3$ if x + y = 15 and xy = 25
   (a) 2250 (b) 1250 (c) 1750 (d) 3250
2. What is the value of $\frac{\sqrt[4]{256}}{\sqrt[6]{64}}$
   (a) 1 (b)2 (c) 4 (d) 8
3. The value of 1.797979……. in p/q form where p and q are integers is
   (a) $\frac{176}{99}$ (b) $\frac{178}{99}$ (c) $\frac{179}{99}$ (d) $\frac{177}{99}$
4. What is the degree of linear equation.
   (a)1 (b) 0 (c) 2 (d) 3
5. If (2,0) is a solution of the linear equation 2x+ 3y = k, then the value of k is
   (a) 4 (b) 6 (c) 5 (d) 2
6. The graph of the linear equation 3x + 2y = 6 cuts the x axis of the point
   (a) (3,0) (b) (2,0) (c) (3,2) (d) (0,0)
7. In the given figure, find PM



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

8. In the given figure, AD is the median then ∠BAD is



(a) 35° (b) 70° (c) 110° (d) 55°

9. If (x +7, 8) = (5, y+7), then find the quadrant in which (x, y) lies.
   (a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

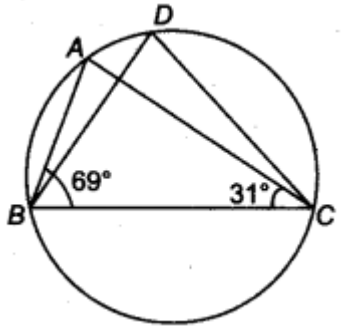
10. If the opposite angle of the parallelogram is 22 less, than thrice the other angle. Find the other angle

    (a) 24° (b) 34° (c) 22° (d) 32°

11. The class mark of the class 90 – 130 is

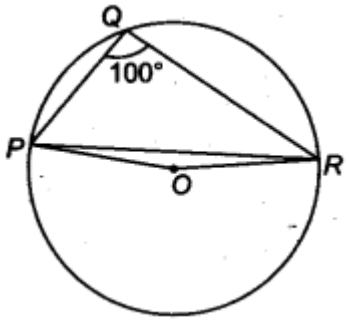
    a) 90 (b) 105 (c) 115 (d) 110

12. In figure, ∠ABC = 69°, ∠ACB = 31°, find ∠BDC.



(a) 70^0 (b) 80^0 (c) 90^0 (d) 100^0

13. In figure, ∠PQR = 100°, where P, Q and R are points on a circle with centre O. Find ∠OPR.



(a) 30° (b) 50^0 (c) 10° (d) 20°

14. Find the area of an equilateral triangle having side 6 cm.
    (a) 10√3 m² (b) 15√3 m² (c) 9√3 m² (d) 36√3 m²

15. If every side of a triangle is doubled, then find the percent increase in area of triangle so formed.
    (a) 100% (b) 300% (c)200% (d) 400%

16. The length of the sides of a triangle is 5 cm, 7 cm and 8 cm. Find the area of the triangle.
    (a)10√3 m² (b) 15√3 m² (c) 9√3 m² (d) 36√3 m²

17. How many balls each of radius 1 cm can be made by melting a big ball whose diameter is 8 cm.
    (a) 54 (b) 64 (c) 36 (d) 76

18. What is TSA of a cone of radius 7 cm and height 24 cm
    (a)710 cm^2 (b) 704 cm^2 (c) 700 cm^2 (d) 725 cm^2

DIRECTION: In the question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**.
Choose the correct option

19. Statement A (Assertion): If the diagonal of a parallelogram are equal, then it is a rectangle.
Reason: The diagonals of a parallelogram bisect each other at right angles.

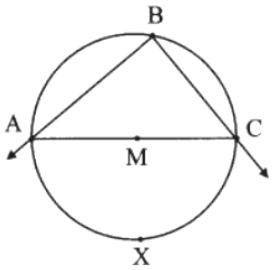
(a)Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

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

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

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

20. Statement A (Assertion): AB is the diameter of a circle with centre O. P is a point on the circumference of the circle such that BA = BC, then $\angle BAC = 45^0$.



Reason : Angle in a semicircle is a right angle.

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

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

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

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

SECTION B

Section B consists of 5 questions of 2 marks each.

21. If a + b + c = 9 and ab+ bc + ca = 26, find $a^2 + b^2 + c^2$

22. Find the value of k if x = 1 and y = 2 is the solution of the equation $3x + 2y = \frac{1}{k}$

23. Point C is called a mid-point of line segment AB. Prove that every line segment has one and only one mid-point.

24. Perimeter of an equilateral triangle is 12 cm. find the height of the equilateral triangle.

OR

Sides of a triangular plot are in the ratio 4 : 5: 6 and its perimeter is 300 m. Find the lengths of its sides.

25. The circumference of the edge of a hemispherical bowl is 132 cm. Find the volume of the bowl.

OR

How many cubic centimeters of water can a conical vessel of base diameter 42 cm and slant height 29 cm hold.

SECTION C

Section C consists of 6 questions of 3 marks each.

26. Express 0.123333….in the form p/q where p and q are integers where q≠0.

27. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the x – axis and one of the vertices lies in the third quadrant.

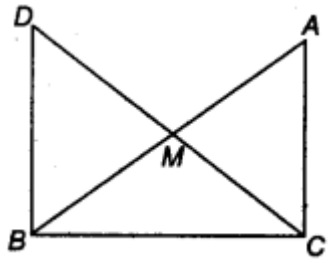
28. In the equation 10x – 3y = 15, Seema wants three different solutions. Find them.

29. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B . Show that

(i) $\Delta AMC \cong \Delta BMD$

(ii) $\angle DBC$ is a right angle

(iii) $\Delta DBC \cong \Delta ACB$



30. Show that the diagonals of a square are equal and bisect each other at right angles.

OR

ABCD is a rectangle in which diagonal AC bisects ∠A as well as ∠C. Show that
(i) ABCD is a square
(ii) diagonal BD bisects ∠B as well as ∠D.

31. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If ∠DBC = 70°, ∠BAC is 30°, find ∠BCD. Further, if AB = BC, find ∠ECD.

OR

A circular park of radius 20 m is situated in a colony. Three boys Ankur, Syed and David are sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone.

SECTION D

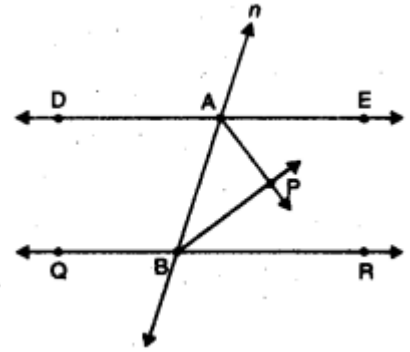
Section D consists of 4 questions of 5 marks each.

32. If the polynomials $2x^3 + ax^2 + 3x - 5$ and $x^3 + x^2 - 4x + a$ leave the same remainder when divided by $x - 2$, find the value of a.

OR

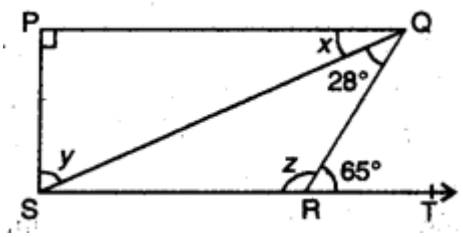
The polynomials $ax^3 + 3a^2 - 3$ and $2x^3 - 5x + a$ when divided by $(x - 4)$ leave the remainders R_1 and R_2, respectively. Find the values of a if $R_1 = R_2$

33. In figure, DE || QR and AP and BP are bisectors of ∠EAB and ∠RBA respectively. Find ∠APB.



OR

In the given figure, if PQ ⊥ PS, PQ || SR, ∠SQR = 28^0 and ∠QRT = 65°. Find the values of x, y and z.



34. Draw a histogram of the weekly pocket expenses of 125 students of a school given below :

Weekly Pocket Expenses (in Rs)	Number of students
0-10	10
10-20	20
20-30	10
30-40	15
40-70	30
80-100	40

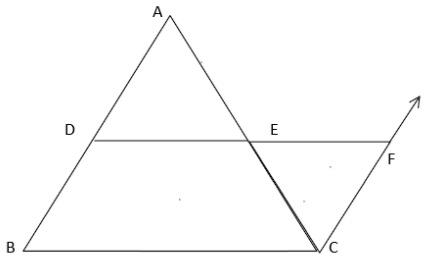
35. Find a and b, if

$$\frac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}}+\frac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}}=a+\sqrt{15}b$$

SECTION E

Case study based questions are compulsory.

36. Ananya wants to frame a question based on quadrilaterals. So she draws a triangle ABC where D and E are mid-points of AB and AC of triangle ABC. Now she wants to prove DE || BC. She constructs a line CF || AB



a. If BC = 12 cm. Find half of DE. (1mark)

b. Find the area of DECB if DG⊥ BC and DG = 7 cm, DE = 6 cm and BC = 12 cm. (2 marks)

OR

Ananya proved $\Delta ADE \cong \Delta CEF$ *by using which rule and state the matching pairs used to prove it.*

c. What is the shape of DECB. (1 mark)

37. The Great Stupa at Sanchi is one of the oldest stone structures in India and an important monument of Indian architecture. It was originally commissioned by the emperor Ashoka in the 3rd century BCE. Its nucleus was a simple hemispherical brick structure built over the relics of the Buddha. It is a perfect example of combination of solid figures. A big hemispherical dome with a cuboidal structure mounted on it.(Take $\pi = \frac{22}{7}$)



(i).What is the formula to find the volume of sphere. (1 mark)

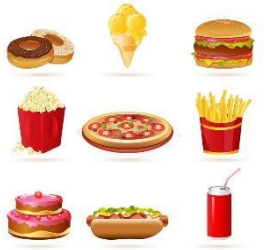
(ii) Find the volume of the hemispherical dome if the height of the dome is 21 m. (2 marks)

OR

How many sq. m cloth require to cover the hemispherical dome if the radius of its base is 14m.

(iii) If the radius of sphere is 2r, then what is its volume. (1 mark)

38. Junk food is food that contains high levels of salt, sugar, fats and lack of nutrients such as vitamins, fibres and minerals, consuming them can lead to short and long –term health complications, including weight gain. If α *be the number* of children who take junk food and β be the number of children who take healthy food such that $\alpha > \beta$ where α *and* β are the zeroes of the quadratic polynomial $f(y) = 2y^2 - 18y + 40$.



a. If a quadratic polynomial has 2 zeroes, then what is the maximum zeroes of the cubic polynomial. (1 mark)

b. How many students take junk food

OR

Find the number of students who take healthy food. (2 marks)

c. Find the value of p(-1) (1 mark)

CLASS IX

Session- 2022-23

Subject- Mathematics

Sample Question Paper 4

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

General Instructions:

1. **This Question Paper has 5 Sections A-E.**
2. **Section A has 20 MCQs carrying 1 mark each**
3. **Section B has 5 questions carrying 02 marks each.**
4. **Section C has 6 questions carrying 03 marks each.**
5. **Section D has 4 questions carrying 05 marks each.**
6. **Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.**
7. **All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E**

Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION A

Section A consists of 20 questions of 1 mark each.

1. What is the value of $(256)^{0.16} + (256)^{0.09}$

(b) 4 (b)16 (c) 64 (d) 256.25

2. The simplest rationalising factor of $\sqrt[3]{500}$ is

(a)$\sqrt[3]{2}$ (b) $\sqrt[3]{5}$ (c)$\sqrt{3}$ (d)none of these

3. If a +b+ c = 9 and ab + bc + ca = 23 then $a^2 + b^2 + c^2$

(a) 35 (b) 58 (c) 127 (d) none of these

4. If x = -1 and y = 2 is a solution of the equation 3x + 4 y = k, find the value of k.

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

5. What is the distance between the graph of the equations x = - 3 and x = 2

(a) 4 units (b) 6 units (c) 5 units (d) 2 units

6. The graph of the linear equation 2x – y = 4 cuts the x axis at the point

(a) (2,0) (b) (-2,0) (c) (0,-4) (d) (0,4)

7. If two acute angles of a right angle are equal, then each acute is equal to

(a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0

8. If $\Delta ABC \cong \Delta LKM$ *equal to side AC of* ΔABC *is*

(a) LK (b) KM (c) LM (d) None of these

9. The bisectors of the angle of a parallelogram enclose a

(a) parallelogram (b) rhombus (c)rectangle (d) triangle

10. The area of the triangle formed by the points A (2,0) , B(6,0) and C (4,6) is

(a) 24 sq units (b) 12 sq units (c) 10 sq units (d) none of these

11. Diagonals of a quadrilateral ABCD bisect each other. If $\angle A = 45^0$ then what is $\angle B$

(a) 115° (b) 120° (c) 125° (d) 135°

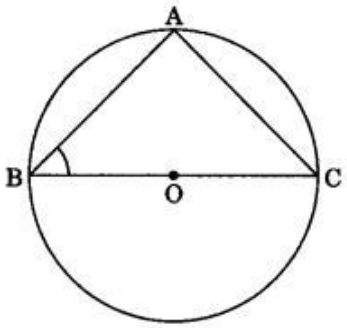
12. The class mark of the class 200 – 250 is

a) 200 (b) 225 (c) 250 (d) 450

13. A chord is at a distance of 8 cm from the centre of a circle of radius 17 cm. The length of the chord is

(a) 25 cm (b) 12.5 cm (c) 30 cm (d) 9 cm

14. In the given figure, BOC is a diameter of a circle and AB = AC. Then, ∠ABC =



(a) 30° (b) 45° (c) 60° (d) 90°

15. The base of a right triangle is 48 cm and its hypotenuse is 50 cm. The area of the triangle is

(a) 168 cm² (b) 252 cm² (c) 336 cm² (d) 504 cm²

16. What is the length of each side of an equilateral triangle having an area of $4\sqrt{3}$ cm²

(a) 4 cm (b)5cm (c) 7 cm (d) 6 cm

17. If the surface area of a sphere is 144π m^2, then its volume(in m^3) is

(a) 288 π (b) 316 π (c) 300 π (d) 188 π

18. The total surface area of one cone of radius 7 cm and height 24 cm (Take $\pi = \frac{22}{7}$)

(a) 710 cm^2 (b) 704 cm^2 (c) 700 cm^2 (d) 725 cm^2

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

Choose the correct option

19. Statement A (Assertion): If the diagonal of a quadrilateral are equal, then it is a square.

Reason: All the angles of the square are 90^0.

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

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

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

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

20. Statement A (Assertion): The length of a chord which is at a distance from the centre of a circle of radius 25 cm is 48 cm.

Reason: The perpendicular from the centre of a circle to a chord bisects the chord.

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

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

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

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

SECTION B

Section B consists of 5 questions of 2 marks each.

21. Factorise $8a^3 + b^3 + 12\ a^2b + 6ab^2$

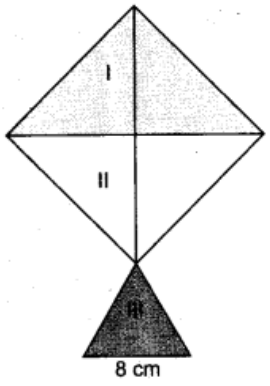
22. Write two solutions of the equation $3x + 4y = 7$

23. Define (a) Intersecting lines (b) Ray

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

OR

A kite in the shape of a square with a diagonal 32 cm and an isosceles triangle of base 8 cm and sides 6 cm each is to be made of three different shades as shown in figure. How much paper of each shade has been used in it?



25. The diameter of a right circular cone is 8 cm and its volume is 48π cm^3. What is its height.

OR

A hemispherical bowl has inner diameter 11.2 cm. find the volume of milk it can hold.

SECTION C

Section C consists of 6 questions of 3 marks each.

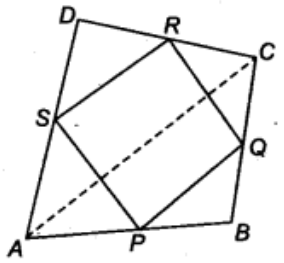
26. Express the decimal 0.123333…….in the form p/q

27. Plot the following points, join them in order and identify the figure thus formed: A(1, 3), B(1, -1), C(7, -1) and D(7, 3)
Write the coordinates of the point of intersection of the diagonals.

28. Give the geometrical representation of $2x + 13 = 0$ as an equation in (i) one variable (ii) two variables

29 In an isosceles triangle ABC, with AB = AC, the bisectors of $\angle B$ and $\angle C$ intersect each other at O. Join A to O. Show that
(i) OB = OC
(ii) AO bisects $\angle A$

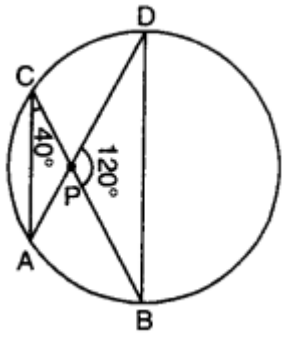
30. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA (see figure). AC is a diagonal. Show that
(i) SR || AC and SR = 1/2 AC
(ii) PQ = SR
(iii) PQRS is a parallelogram.



OR

ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA, respectively. Show that the quadrilateral PQRS is a rhombus.

31. In the given figure, ∠ACP = 40° and BPD = 120°, then find ∠CBD.



OR

If the diagonals of a cyclic quadrilateral are diameters of the circle through the opposite vertices of the quadrilateral. Prove that the quadrilateral is a rectangle.

SECTION D

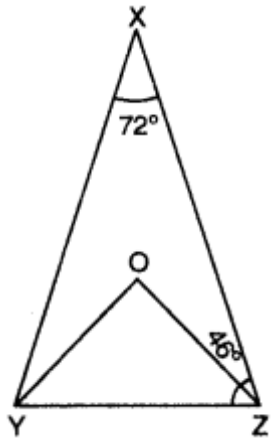
Section D consists of 4 questions of 5 marks each.

32. If both x + 1 and x – 1 are factors of $ax^3 + x^2 - 2x + b$, find the values of a and b.

OR

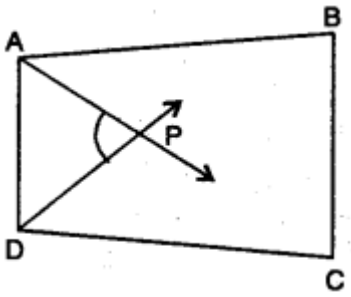
Factorise: $x^3 + 13x^2 + 32x + 20$

33. In the figure, ∠X = 72°, ∠XZY = 46°. If YO and ZO are bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OYZ and ∠YOZ.



OR

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



34. In a school marks obtained by 80 students are given in the table. Draw a histogram.

Marks obtained (Mid Value)	Number of students
305	12
315	18
325	28
335	15
345	5
355	2

35. If $x = 2 + \sqrt{3}$, find the value of $x^3 + \frac{1}{x^3}$

SECTION E

Case study based questions are compulsory.

36. At the end of the 18th century, students in Europe and America were still using individual states made of actual state or pieces of wood coated with paint and grit and framed with wood. Teachers had no way to present a lesson or a problem to the class as a whole. So, in 1801, James Pillians made its debut by hanging a large plate of state on the classroom walls. The dimension of the blackboard were 30 m X 48 m.



a. What can be the shape of blackboard as shown in figure. (1mark)
b. Find the perimeter of the blackboard as shown in figure (2 marks)

OR

If the perimeter of given figure is same as of the square then find the area of square formed.

c. Find the length of the diagonal of the shape shown in figure. (1 mark)

37. Red fort, also called Lal Qila mughal fort in old Delhi, India. It was built by Shah jahan in the mid 17 century and remains a major tourist attraction. The fort was designated a UNESCO world heritage site in

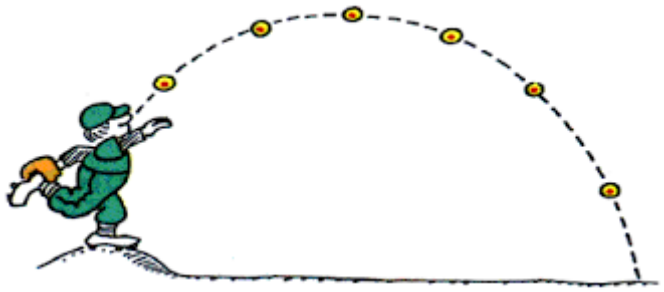
(i).What is the formula to find the surface area of hemisphere. (1 mark)
(ii) If the smaller hemispherical dome's surface area (without the base) is found to be 7700 sq.m.
Determine the diameter. (2 marks)

OR2007. It is surrounded by a 2 km perimeter wall which is aced as an effective defensive measure**.**



If the radius of the hemispherical dome is 7 cm, then what is the volume .
(iii) A ladder was installed to clean the minaret's top. How long should the ladder be if the minaret is 8 metres tall and the base is 15 metres . (1 mark)

38. An object which is thrown or projected into the air, subject to only the acceleration of gravity is called a projectile and its path is called its trajectory. The curved path a projectile follows was shown by Galileo to be a parabola. Parabola is represented by a polynomial. If the polynomial to represent the distance covered is $p(x) = -6x^2 + 48x + 24$.



a. what is the degree of the polynomial

(1 mark)

b. the value of k if x- 3 is a factor of $k^2x^3 - x^2 + 3x - 1$

OR

If the equation of the parabola is given by $p(y) = 3y^2 - 2y - 4$ then what is the value of k

(2 marks)

c. Find the height of the projectile 5 seconds after it's launched.

(1 mark)