Support Material

SA-II

Class - IX

MATHS

(English Medium)

IX Mathematics

(Support Material)
Team Members

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Course Structure
Class - IX

Second Term Marks : 90

Units		Marks
II	Algebra (Contd.)	16
III	Geometry (Contd.) (Quadrilaterals-10 Marks) (Area, Circle & Constructions - 28 Marks)	38
V	Mensuration (Contd.)	18
VI	Statistics	10
VII	Probability	08
	Total (Theory)	90

Note : The text of OTBA for SA-II will be from Unit-III, Chapter 4, Quadrilaterals

UNIT II : ALBEBRA (Contd.)

1. Linear equations in Two Variables (14 Periods)

Recall of linear equations in one variable, introduction to the equation in two variables. Focus on linear equations of the type ax+by+c=0. Prove that a linear euqation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they lie on a line. Graph of linear equations in two variables.

Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III : GEOMETRY (Contd.) (10 Periods)

4. Quadrilaterals

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sider are equal, and conversely.
3. (Motivate) In a parallelogram opposite angles are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and is half of it and (motivate) its converse.

5. AREA (7 Periods)

Review concept of area, recall area of a rectangle.

1. (Prove Parallelograms on the same base and between the same parallels have the same area.
2. (Motivate) Triangles on the same (or equal base) base and between the same parallels are equal in area.

6. CIRCLES (15 Periods)

Through examples, arrive at difinition of circle and related concepts-radius, circumference, diameter, chord, arc, secant, sector, segment, subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the center and (Motivate) its converse.
2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
3. (Motivate) There is one and only one circle passing through three given non-collinear points.
4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center (or their rspective centers) and conversely.
5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
6. (Motivate) Angles in the same segment of a circle are equal.
7. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
8. (Motivate) The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180 and its converse.

7. CONSTRUCTIONS 10 periods

1. Construction of bisectors of line segments and angles of measure 60^0, 90^0, 45^0 etc., equilateral triangles.
2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.
3. Construction of a triangle of given perimeter and base angles.

UNIT V : MENSURATION (Contd.)

2. Surface Areas and Volumes 12 Periods

Surface areas and volumes of cubes, spheres (including hemispheres) and right circular cylinders/ cones.

UNIT VI : STATISTICS 12 periods

Introduction to Statistics : Collection of data, presentation of date - tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons. Mean, median and mode of ungrouped data.

UNIT VII : PROBABILITY 9 Periods

History, Repeated experiments and observed frquency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individuals activities to motivate the concept; the experiments to be drawn from real- life situations, and from examples used in the chapter on statistics.)

QUESTIONS PAPER DESIGN 2016-17 CLASS-IX

Mathematics (Code No. 041)		Time: 3 Hours					Marks: 90
S. No.	Typology of Questions	Very Short Answer (VSA) (1 Mark)	Short Answer-I (SA) (2 Marks)	Short Answer-II (SA) (3 Marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1	**Remembering - (Knowledge based** Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	23	26%
2	**Understanding- (Comprehension** -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	1	1	4	23	26%
3	**Application** (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)	1	2	3	2	22	24%
4	**Higher Order Thinking Skills (Analysis & Synthesis** - Classify, compare, contrast, or differentiate between different pieces of information; Organize and/or integrate unique pieces of information from a variety of sources)	-	1	4	-	14	16%
5	**Creating, Evaluation and Multi-Disciplinary-** (Generating new ideas, product or ways of viewing things Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	-	-	-	2*	8	8%
	Total	4x1=4	6x2=12	10x3=30	11x4=44	90	100%

Note : The questions paper will include a section on open text based assessment (questions of 10 marks). The case studies will be supplied to students in advance.

These case studies are designed to test the analytical and higher order thinking skills of students

* One of the LA (4 marks) will be to assess the values inherent in the texts.

IX Class

SA-II

Maths

Chapter 4	--	Linear equations in two variables.
Chapter 8	--	Quadrilaterals.
Chapter 9	--	Areas of Parallelograms and triangles.
Chapter 10	--	Circles.
Chapter 11	--	Constructions
Chapter 13	--	Surface areas and voloumes
Chapter 14	--	Statistics
Chapter 15	--	Probability

Sample Questions Papers

Chapter - 4

Linear Equations in two Variables

Key Points

Linear equation in one variable - An equation which can be put in the form ax+b=0, a $\neq$ 0 and a, b are real numbers, is called a linear equation in one variable.

Linear equation in two variables - Any equation which can be put in the form ax+by+c=0, where a, band c are real numbers and a, b $\neq$ 0, is called a linear equation in two variables.

3. Linear equation in one variable has a unique solution

   $ax + b = 0 \quad = \quad x = \frac{-b}{a}$

4. Linear equation in two variables has infinitely many solutions.
5. The graph of every linear equation in two variables is a straight line.
6. Every point on the line satisfies the equation of the line.
7. Every solution of the equation is a point on the line. Thus, a linear eq in two variables in represented geometrically by a line whose points make up the collection of solutions of the equation.

Graph :

* The pair of values of x and y which satisfies the given equation is called solution of the equation in two variables.

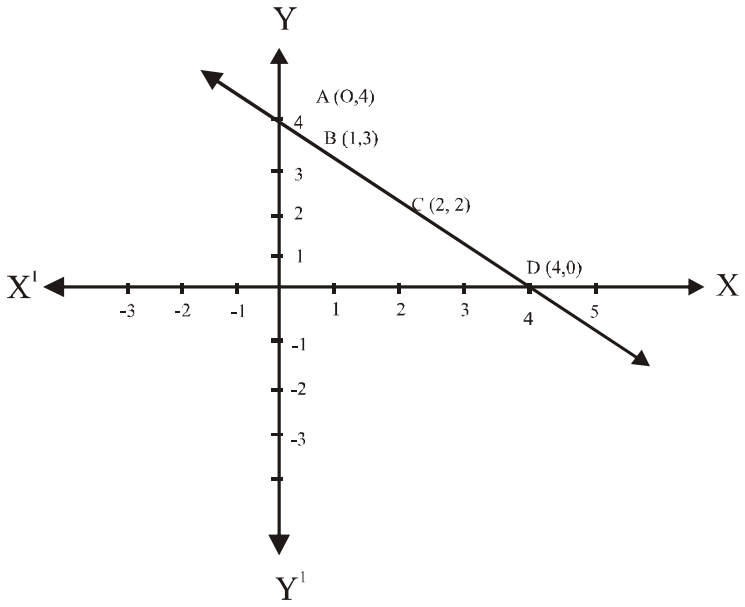
Example : x+y = 4

Solutions of equation

x+y = 4 are

(0,4) (1,3) (2,2) (4,0)

and many more



Part - A

Q.1 The graph of the linear equation 4x=6 is parallel to which axis.

Q.2 Point (a,o) lie on which axis?

Q.3 Write the equation of x axis.

Q.4 Write a linear equation of two variables for x=5, y=-2.

Q.5 Find the value of K, if x=1, y=-1 is a solution of equation Kx-2y=0.

Q.6 Write the linear equation which is parallel to x-axis and is at a distance of 2 units from the origin in upward direction.

Q.7. How many solutions are there for equation y=5x+2

Q.8 Write the equation 5y=9 as linear equation in two variables.

Q.9. If the graph of equation 2x+Ky=10 k intersects x axis at point (5,0) find the value of K.

Q.10. Express the linear equation $\sqrt{}$2x-4=5y in the form of ax+by+c=0 and thus indicate the values of a,b and c.

Q.11. Expuess x in terms of y for the equation 3x+4y=7

Q.12. Express y in the terms of x.

3y+5x = 9

PART - B

Q.13 Examine whether the point (5,2) lie on the graph of equation 2x+3y =16.

Q.14. Find any two solutions of equation

2x+y = x+5.

Q.15. Find the value of P if x=2, y=3 is a solution of equations. 5x+3py=4a

Q.16. Write the equations of two lines passing through (3, 10).

Q.17. Write the coordinates of the point where the graph of the equation 5x+2y=10 intersect both the axes.

Q.18. If the points A (3,5) and B (4,4) lies on the graph of line ax+by=7. Find the value of a.

Q.19. The cost of coloured paper is ₹7 more than 1/3 of the cost of white paper. Write this statement in linear equation in two variables.

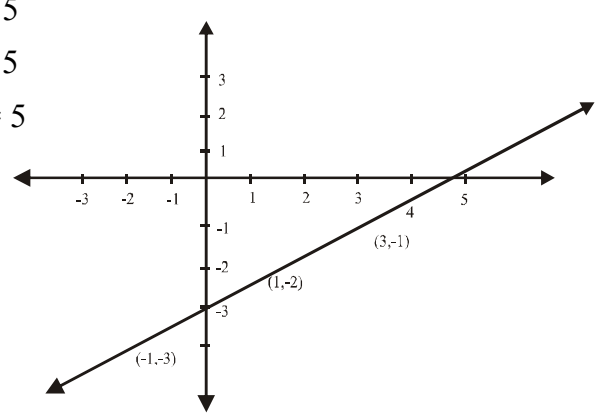
Q.20. Draw the graph of equation x+y=5.

Q.21. From the choices given below, choose the equation whose graph is given in figure -

(i) x+2y = 5

(ii) x - 2y = 5

(iii) y + 2x = 5



Q.22. Write the statement in linear equation in two variables showing relationship between Fahrenheit and Celsius.

PART C

Q.23. If the points A (4,6) and B (1,3) lie on the graph of ax+by =8. then find the value of a and b.

Q.24. Find the value of 'a' if (1, -1) is the solution of the equation 2x + ay = 5. Find the other two solutions of the equation.

Q.25. Draw the graph of the linear equation 2x+3y =6. Find out the coordinates of the points where the two lines intersects at x axis and y - axis.

Q.26. Find two solutions of the equation 4x + 5y = 28. Check whether (-2, 10) is the solution of the given equations

Q.27. Give the geometrical representation of 5x + 7 = 0 as equation.

(i) in one variable

(ii) in two variables

Q.28. The length of the rectangular park is 10m more than its breadth. Perimeter of the park is 180m. Find out the dimensions of park using linear equations in two variables.

Q.29. Draw the graph for the linear equations

3x - 4y = 12. If x = 8 Find the value of y with the help of graph.

Q.30. Find three different solutions of 3m - 8n = 27.

Q.31. F = (9/5) C + 32.

(i) If the temperatiure is 35^0C, what is the temperature in Farhenheit?

(ii) if the temperature is 30^0C, what is the temperature in rahrenheit?

Q.32. If x= 3k - 2, y=2k is a solution of equation 4x - 7y +12=0, then find the value of K.

PART - D

Q.33. Draw the graph of the linear equations $2y - x = 7$. With the help of graph check whether $x = 3$ and $y = 2$ is the solution of the equation?

Q.34. Solve for x

$$\frac{3x-5}{3} + \frac{4(x+2)}{5} = \frac{25x+7}{15}$$

Q.35. A men went to the Bank with ₹ 1000. He asked the cashier to give him ₹ 5 and ₹ 10 notes only in return. Write the linear equation in two variables. If no. of ₹10 Notes are 25, then find the no. of ₹ 5 Notes? Also represent it graphically?

Q.36. Write $3y = 8x$ in the form of $ax+by+c = 0$ Write x in terms of y. Find any two solutions of the equation. How many solutions you can find out?

Q.37. The age of father is 3 years more than three times the age of his son. There years hence, father's age will be ten years more than twice the age of the son. Assuming father's age as x and son's age as y form two linear equations.

Q.38. The force exerted to pull a cart is directly proportional to the accleration produced in the body, write a linear equation in two variables to represent the statement by taking constant mass equal to 3kg. Read form the graph the force (in Newton) required when the accleration produced is $5 m/sec^2$.

Q.39. Rohan and Ramita of Class IX decided to collect ₹ 25 for class cleanliness. Write it in linear equations in two variables. Also draw the graph. What values of both the students are depicted here?

Q.40. Sarika distributes chocolates on the occasion of children's Day. She gives 5 chocolates to each child and 20 chocolates to adults. If no. of child is represented by 'x' and total distuibuted chocolates as 'y'.

(i) Write it in form of linear equation in two variables.

(ii) If she distributed 145 chocolates in total, find out no. of children?

(iii) Which values are depicted here?

Q.41. Priyanka and Arti decided to donate ₹ 1600 for the earthquake victims in Gujrat considering Priyanka's share as 'x' and Arti share as 'y'.

(a) Form a linear equation in two variables.

(b) If Priyanka donates thrice the amount donated by Arti, than find out the amount donated by both.

(c) What values of both the children are depicted here?

Q.42. In a Residential society, Rain water is stored in underground water tank. If the water stored at the rate of 30 cubic cm per second. If water store in 'x' seconds and 'y' cubic cm.

(i) Write this statement in linear equation in two variables.

(ii) Write this equation in the form of
$ax + by + c = 0$

(iii) What value of the society members shows in Rain water storage?

Q.43. Riya participates in Diwali Mela with her friends for the charity to centre of handicapped children. They donate

₹ 3600 to the centre from the amount earned in Mela. If each girl donates ₹ 150 and each boy donates Rs. 200.

(a) Form the linear equation in two variables.

(b) If no. of girls are 8, find out no. of boys.

(c) What values of Riya & her friends are depicted here?

Chapter-4

Linear Equations in Two Variables

Answers

1. 'y' अक्ष के समांतर (paralled to y-axis)
2. 'x' अक्ष (x-axis)
3. $y = 0$
4. $2x - y = 12$
5. $k = -2$
6. $y = 2$
7. अनेक हल (Infinitely many solutions)
8. $0.x + 5.y = 9$
9. $K = 1$
10. $\sqrt{}2x - 5y - 4 = 0$

    जहाँ $a = \sqrt{}2$ $b = -5$ $c = -4$
11. $x = \frac{7 - 4y}{3}$
12. $y = \frac{9 - 5x}{3}$
13. हाँ (yes)
14. (1, 4) (0, 5)
15. $P = \frac{4a - 10}{9}$
16. $3x - y + 1 = 0$

    $12x + 7y = 106$
17. (0,5) and (2,0)
18. $a = -1$
19. $3x - y = 21$

21. $x - 2y = 5$

22. $f = \frac{(9)}{5} c + 32$

23. $a = -4$ $b = 4$

24. $a = -3$

25. (3,0), (0,2)

26. (2,4) (7,0) नहीं

28. 50m, 40m

29. $y = 3$

30. (1, -3), (9,0) और (-7, -6)

31. 105^0 F, 86^0 F

32. $K = -10$

33. नहीं (No)

34. $x = 4$

35. 150

36. a =8 , b = -3, c=0 infinite solutions
अनंत हल हो सकते है।

37. $x = 3y + 3$
$x = 2y + 13$

38. $y = 3x$ जहाँ y बल है। और x त्वरण है (y= force, x = accleration
बल = 15 N

39. $x + y = 25$

40. (i) $5x + 20 = y$
(ii) 25
(iii) Happiness, Sharing, Harmony

41. (a) $2x + y = 1600$
(b) Priyanka ₹ = 1200, Arti ₹ = 400

(c) मानवता, सहानुभूति, दूसरो की मदद
(helpfulness, caring, social responsibility, sensitivity)

42. (i) $y = 30x$

(ii) $30x - y + 0 = 0$

(iii) पर्यावरण सुरक्षा, सहयोग

42. (a) $150x + 200y = 3600$

(b) Boys = 12

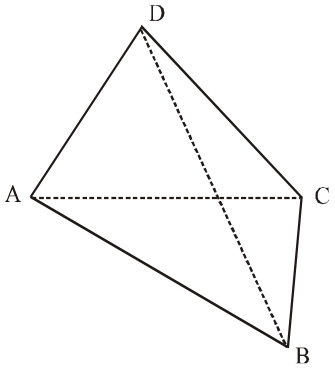
(c) Co-operation, sincerity, helpfulness, concerned
सहयोग की भावना, मदद की भावना, टीम कार्य क्षमता

Chapter - 8

Quadrilaterals

Key Points

1 Quadrilateral : - A figure bounded by four line sigments. In a quadrilateral are



i) Two pairs of opposite side (no common point)]

ii) Two pairs of opposite angles ∠A & ∠C and ∠B & ∠D.

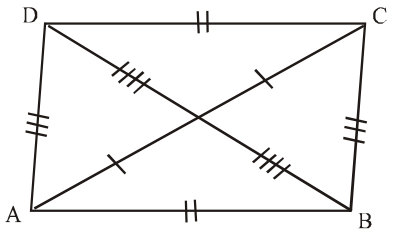
iii) Four pairs of adjacent sides AB & BC, BC & CD
CD & AD and AD & AB (one common point)

iv) Four pairs of adjacent angles ∠A & ∠B, ∠B &∠C, ∠C ∠D & ∠A.

v) Line segment join opposite vertices called diagonal of quadrilateral. AC & BD.

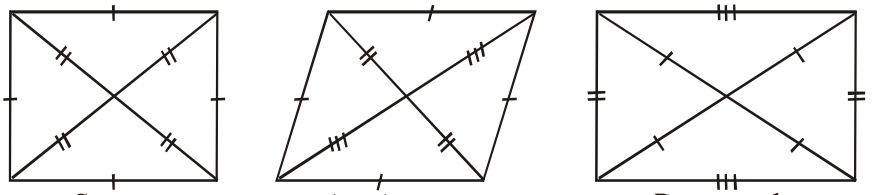
vi) Sum of the angles of a quadrilateral 360^0 is ∠A+∠B+∠C+∠D = 360^0.

2. Parallelogram : - A quadrilateral is a parallelogram if .

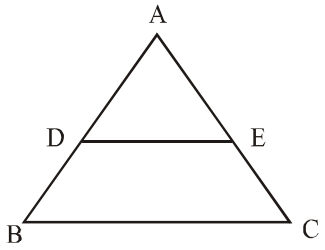


* Opposite sides are euqal or
* Opposite angles are equal or
* Diagonals bisects each other or
* One pair of opposite sides is equal and parallel

3. A diagonal of a parallelogram divides it into two congurent triangles examples of parallelogram.



4. Theorem :- A line segment joining the mid points of the two sides of a triangle is parallel to the third side and is half of it.
If D & E are mid points then DE II BC and DE = $\frac{1}{2}$ BC



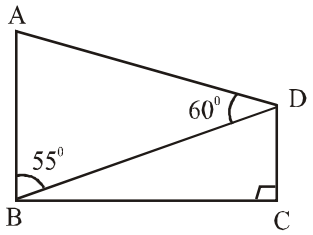
5. Converse of mid point therom.
The line drawn through the mid point of one side of a triangle, paralle to another side bisects the third side.

Chapter - 8

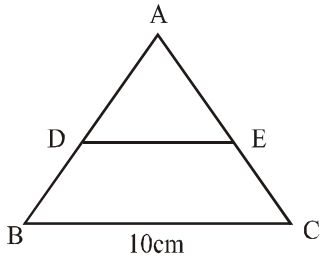
Quadrilaterals

Part - A

1. In a rhombus ABCD, if $\angle A = 60^0$ find $\angle B$, $\angle C$ & $\angle D$.
2. The angles of a quadrilateral are in the ratio 1:2:4:5. Find the measure of each angle.
3. If in a rhombus LMNP, $\angle LNM = 40$ then what is the measure of $\angle LPM$?
4. In a parallelogram if all the four angles are in the ratio 1:1:1:1 then, what type of parallelogram is this one?
5. In the figure, AB II CD, what will be the measure of $\angle ADC$.



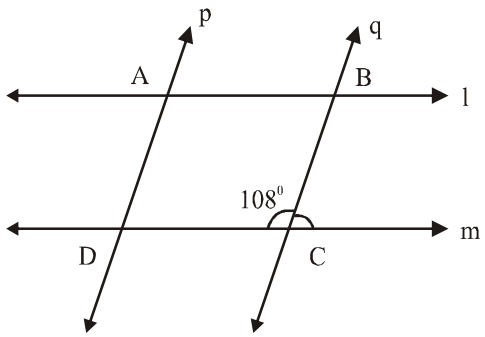
6. In the figure, if D & E are respectivly the mid points of AB & AC, what will be the length of ED.



7. PQRS is a rhombus with $\angle QPS = 50^0$. Find $\angle RQS$
8. The angles of a quadrilateral are in the ratio 2:3:5:8. Find all

the angles of the quadrilateral.

9. In the figure line l || m and p || q, $\angle BCD = 108^0$ find all four angles of quadrilateral ABCD.



10. If two adjacent angles of a parallelogram ABCD are in the ratio 5:4 find all the angles of the parallelogram.

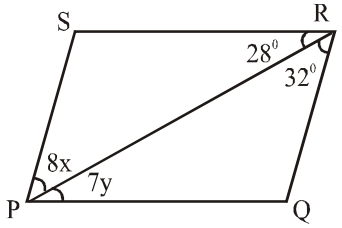
PART - B

11. Prove that the sum of all the four angles of a quadrilateral is 360:

12. Show that opposite angles of a parallelogram are equal.

13. In a parallelogram ABCD $\angle B=110^0$ determine the measure of $\angle A$ and $\angle D$.

14. In the figure if PQRS is a parallelogram. then find the value of x & y.



15. The diagonals of a parallelogram ABCD interseet at O. A line through O intersects AB at X & DC at Y. Prove that OX=OY.

16. In a parallelogram ABCD diagonals AC and BD intersect at O and AC = 7.4 cm. and BD = 6.2 cm. Find the length of AO and BO

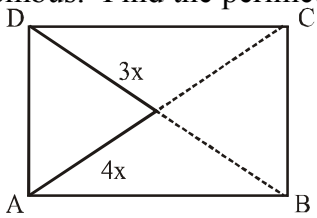
17. Two opposite angles of a parallelogram are (5x-3) and (4x+12). Find the measure of each angle of the parallelogram.

18. If two adjacent angles of a parallelogram are (10y -9) and (8y+45). Find all the four angles of Parallelogram.

19. The perimeter of a parallelogram is 30 cm. If longer side is 9.5 cm then find the length of shorter side.

20. In a parallelogram ABCD diagonals AC and BD intersect at O and AC = 12.6 cm and BD = 9.4.cm Find the measures of OC and OD.

21. ABCD is a rhombus. Find the perimeter of ABCD.

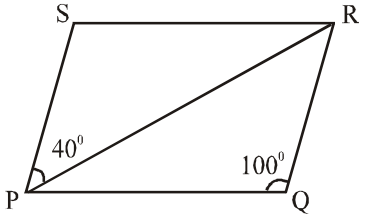


22. The angles of a quadrilateral are (x+20), (x-20), (2x+5), (2x-5). Find the value of x

PART - C

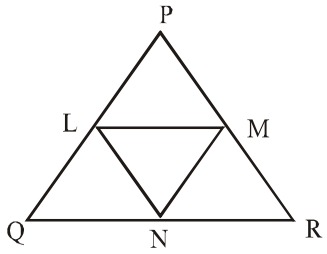
23. ABCD is a rectangle in which diagonal AC bisects ∠A as well as ∠C. Show that ABCD is a square.

24. In the adjoining figure if PQRS is a parallelogramam and ∠PQR = 100 and ∠SPR = 40. Find ∠PRQ and ∠SRQ



25. Prove that the line segment joining the mid points of two sides of a triangle is parallel to the third side.

26. In the given figure L, M, and N are mid point of the sides PQ, PR and QR respectively of △PQR. If PQ = 4.4 cm, QR = 5.6 cm and PR = 4.8 cm then find the perimeter of △LMN.



27. A quadrilateral is a parallelogram if one pair of opposite sides are equal and parallel . Prove it.

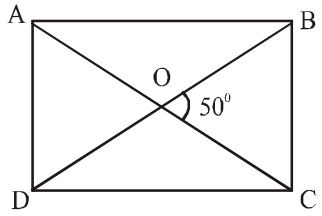
28. If the diagonals of a quadrilateral bisect each other then quadrilateral is a parallelograms. Prove it.

29. In a parallelograms PQRS, M and N are points on PQ and RS such that PM = RN Prove that MS ∥ NQ.

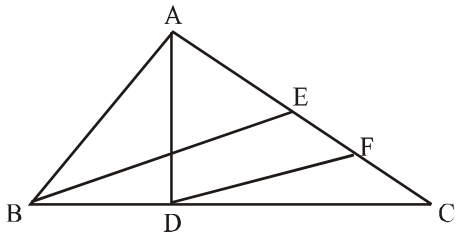
30. In a parallelogram ABCD, AP and CQ. are drawn perpendiculars from vertices A and C on diagonal BD. Prove

that $\triangle APB \cong \triangle CQD$

31. The diagonals of a rectangle ABCD meet at O. If $\angle BOC = 50$ then find $\angle ODA$.



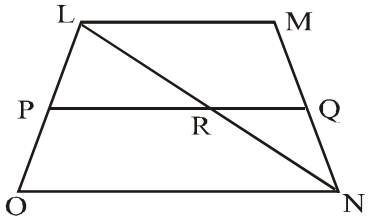
32. In the given figure AD and BE are the medians of $\triangle ABC$ and BE || DE Prove that CF=1/4 AC.



PART - D

33. AD is a median of $\triangle ABC$ and E is the mid point of AD, BE produced meets AC in F. Prove that AF = 1/3 AC

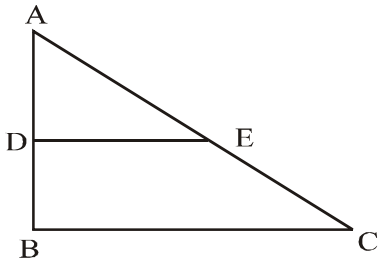
34. In the Figure LMNO, is a trapezium in which LM is parallel to side ON and P is the mid point of side LO. If Q is a point on the side MN such that segment PQ is parallel to side ON Prove that Q is the mid point of MN and PQ = 1/2 (LM + ON).



35. In the figure, $\triangle$ABC is right angled at B. If AB=9 cm AC=15 cm. and D and E are the mid points of AB & AC respectively calculate.

(i) The length of BC

(ii) The area of trapezium BCED



36. Show that bisectors of angles of parallelogram from a rectangle.

37. A farmer has divided his field into three parts as in the figure. Ist part in used to take care of his cattles. While II and III are used to grow two different crops.

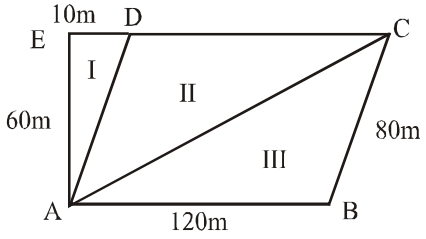
Answer the following :-

i) How much area has been used to take care for cattles.

ii) Are the two areas part II & part III equal ? Justify.

iii) What is the total area of the field -

iv) What values of the farmer are depicted here.

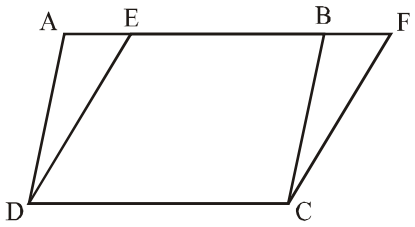


Chapter - 9

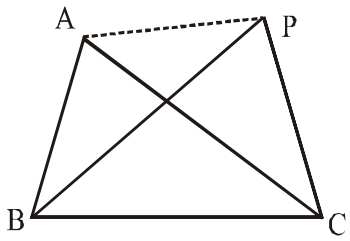
Areas of Parallelograms & Triangles

Key Points

1. Parallelograms on the same base and between same parallels are equal in area.
   Two parallelograms ABCD and EFCD on the same base DC and between same parallels AF and DC
   ar (ABCD) = ar (EFCD)



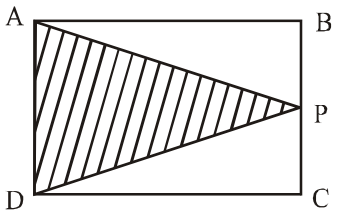
2. Two trangles on the same base (or equal base) and between the same parallels are equal in area.
   Two triangles ABC and PBC on the same base BC and between same Parallel lines BC and AP in the given figure then
   ar (ΔABC) = ar (ΔPBC)



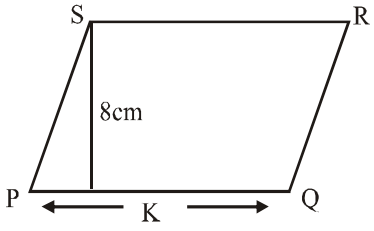
3. Two triangles having the same base (or equal bases) and equal areas lies between the same parallels.

PART - A

1. If area of Parallelogram ABCD is 80 cm^2. Find the area of $\triangle$APD



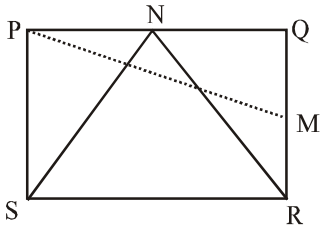
2. If area of Parallelogram PQRS is 88 cm^2 find K.



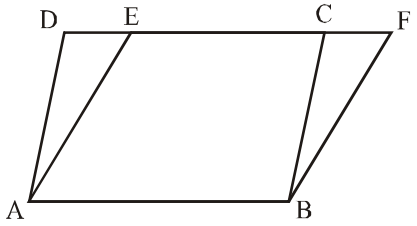
3. PQRS is a Parallelograms and PQM is a triangle. If area of PQM = 18cm^2. Find the area of PQRS.

4. In $\triangle$ABC, AD is median. If area of $\triangle$ABD=25 cm^2 find the area of $\triangle$ABC

5. In the given figure area of $\triangle$SRN = 21 cm^2 RQ = 6cm find PM.



6. In the figure ABCD and ABFE are Parallelograms then find or ($\triangle$BCF).



7. If two parallelogram are on equal base and between the same parallels, then what is the ratio of their areas.

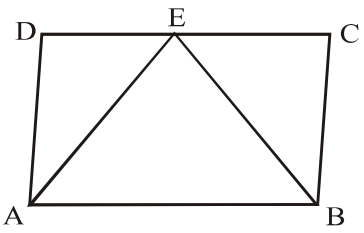
8. A triangle and a Parallelograms are on the same base as well as between the same parallels then find the ratio of areas of triangle to that of the parallelogram.

9. In $\triangle$ABC, D,E,F are respectively the mid points of the sides AB, BC and AC. Find ratio of the area of $\triangle$DEF and area of $\triangle$ABC.

10. If the base of a parallelogram is 8 cm and its altitude is 5 cm then find its area.

11. If two triangles are on the same base and between the same parallels. Then find the ratio of area of the two triangles.

12. In given figure. If area of parallelogram ABCD is 30 cm^2 than find ar ($\triangle$ADE) + ar $\triangle$BCE)



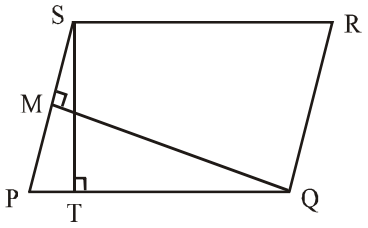
PART - B

13. Show that the median of a triangle divides it into two triangles of equal areas.

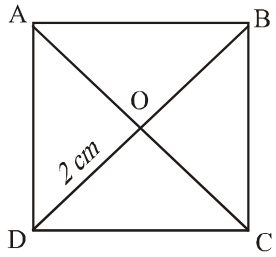
14. Pand Q are any two points lying on the side DC and AD respectively of a parallelogram ABCD. Show that ar (APB) = ar (BQC).

15. If the ratio of altitude and area of the parallelogram is 2:11 then find the length of the base of parallelogram.

16. In figure if PQRS is a parallelogram in which PQ=12 cm ST=9cm QM=6cm, ST $\perp$ PQ, QM $\perp$ SP then find length of SP.

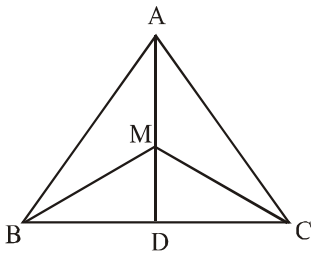


17. In given fig. ABCD is a square whose diagonals are intersecting at O. If OD = 2 cm then find the length of AB.



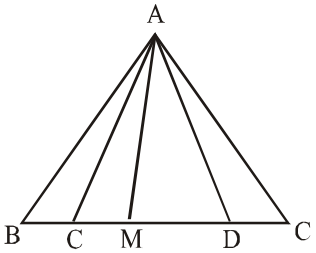
18. AD is median of $\triangle$ABC. If x is any point on AD Show that ar ($\triangle$ABX) = ar ($\triangle$ACX).

19. M is any point on the median AD of $\triangle$ABC. Show that ar (AMB) = ar (AMC)

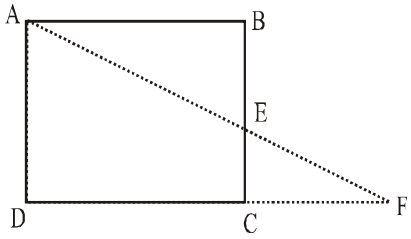


20. If D, E and F are respectively the mid points of sides BC, CA and AB of ΔABC show that.
    (i) BDEF is a parallelogram.
    (ii) ar (DEF) = 1/4 ar (ΔABC)

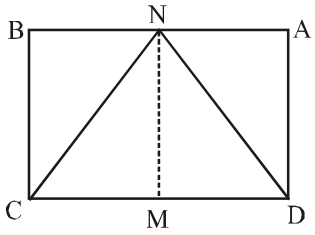
21. In the given figure BC = CD = DE
    M is the mid point of CD then find the area of ΔAMC



22. ABCD is a parallelogram. Through point A, a line AEF is drawn to meet BC at E. DC produced at F. Show that ar (ΔBEF) = ar (ΔDCE).



23. In the given figure, the area of parallelogram ABCD is 40 cm^2. If MN is a median of ΔCDN then find the area of ΔNDM.

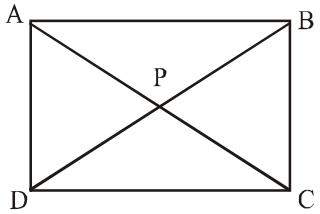


PART - C

24. In the figure, P is the point in the interior of parallelogram ABCD then show that

(i) ar (APB) + ar (PCD) = 1/2 ar (ABCD)

(ii) ar (APD) + ar (PBC) = ar (APB) + ar (PCD)

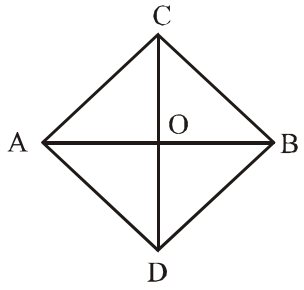


25. ABCD is a trapezium in which the AB II DC. If diagonal AC and BD intersect at O. Prove that ar (AOD) = ar (BOC).

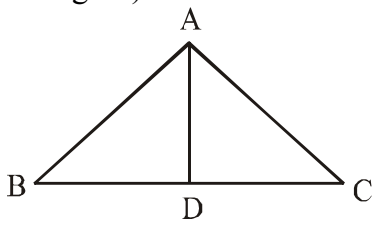
26. ABCD is a parallelogram whose diagonals AC and BD intersect at O. A line through O intersects AB at P and DC at Q. Prove that. ar (ΔPOA) = ar (ΔQOC).

27. Diagonal PR and QS of quadrilateral PQRS intersect at T such that
PT = TR and PS = QR. show than
ar (ΔPTS) = ar (ΔRTQ).

28. In the figure, ABC and ABD are two triangle on the. Same base AB. If line segment CD bisects AB at O Show ar (ABC) = ar (ABD).



29. In given figure AD is mediam. Prove that ar ($\triangle$ABD) = ar ($\triangle$ACD) (Draw Figure).

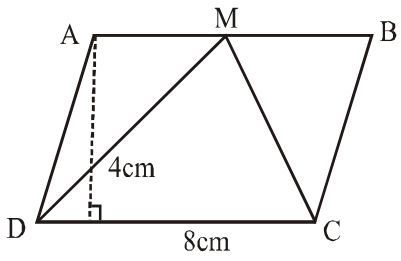


PART - D

30. Prove that parallelograms on the same base and between same parallels are equal in area.

31. Prove that the two triangles on the same base and between the same parallels are equal in area.

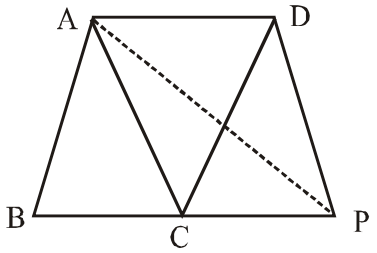
32. If a triangle and parallelogram are on the same base and between the same parallels then prove that the area of triangle is equal to the half the area of parallelogram. using this find ar ($\triangle$CMD).



33. XY is a line parallel to side BC of a triangle ABC. If BE II AC and CF ‖ AB meet XY at E and F respectively show that ar (ABE) = ar (ACF).

34. If E, F, G and H are respectively the mid points of the sides of a parallelograms ABCD. Show that ar (EFGH) = 1/2 ar (ABCD).

35. There is a plot in a village in the shape of a quadrilateral ABCD. Head of the village wants to get floor cemented so as to use it for panchayat meetings.
Later he decided to construct playground of shape △ABP for children. If AC II DP then
(a) Prove than ar (ABCD)= ar (ABP)
(b) Which values are depicted here?



36. A farmer has a square plot of land where the wants to grow five different crops at a time. On half of the area in the middle he want to grow rice but in rest four equal triangular parts he wants to grow different crops.
a) Explain by diagram how he can divide the area to fulfill his purpose.
b) By using the crop pattern which values are depicted by the farmer.

Chapter - 9

Area of Parallelograms & Triangles

ANSWERS

1. 40 cm^2
2. 11 cm
3. 36 cm^2
4. 50 cm^2
5. 7 cm
6. 7.5 cm^2
7. 1 : 1
8. 1 : 2
9. 1 : 4
10. 40 cm^2
11. 1 : 1
12. 15 cm^2
15. $\frac{11}{2}$ units
17. $\sqrt{}8$ cm
21. $\frac{1}{6}$ $\triangle$ABC
23. 10 cm^2
32. 22.5 cm^2

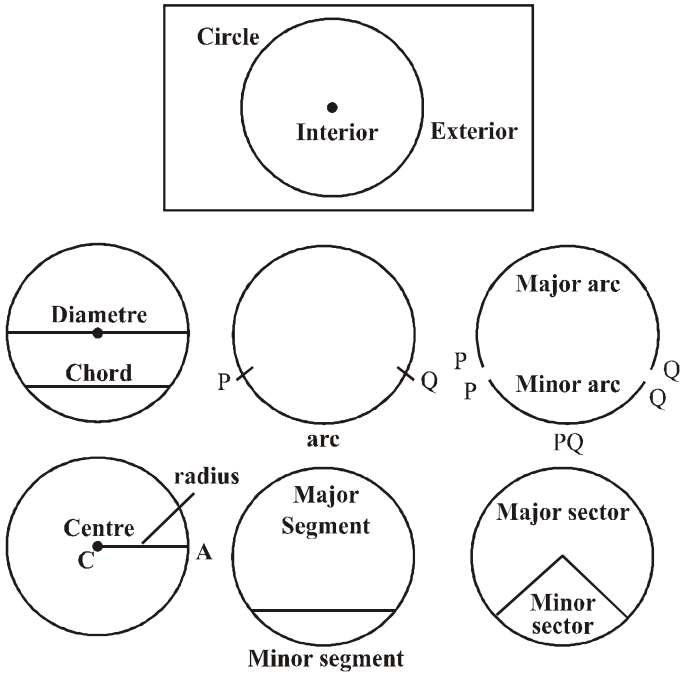
Chapter - 10

Circles

Key Points

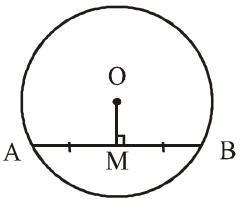
The collection of those points in a plane which are at a fixed distance from a given fixed point is called a circle. That fixed point is called centre of the circle and that fixed distance is called radius.

Circle and related Terms !

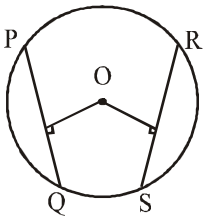


* There is one and only one circle passing through three non collinear points.
* Equal chords of a circle subtends equal angles at centre.
* If angles subtended by chords at centre are equal then chords are equal.
* The perpendicular from centre to a chord of a circle, bisects the chord.

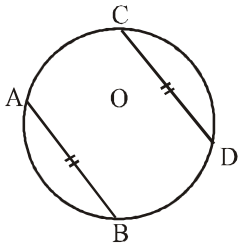
* The line joining the centre of a circle to the mid point of a chord is perpendicular to the chord.



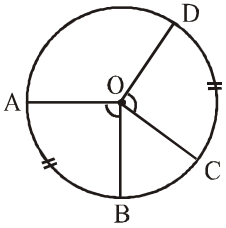
* Equal chords of a circle are equidistant from centre.
* Chords equidistant from centre are equal in length.



* If two chords of a circle are equal then corresponding arcs are equal.
* If arcs of a circle are equal then corresponding chord are also equal.

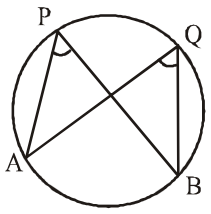


* Congruent arcs of a circle subtends equal angle at centre.

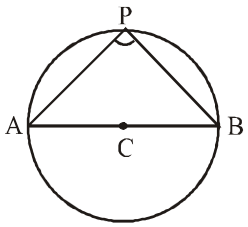


* The angle subtend by an arc at the centre of circle is twice the angle which is subtend at remaining part of circumference.

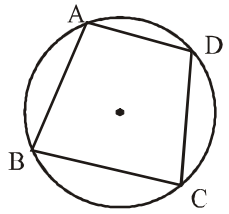
* Any two angles in the same segment of the circle are equal.



* Angle of semi circle is right angle.



* In a cyclic quadridateral the sum of opposite angles is 180^0.
* If sum of opposite angles of a quadrilateral is 180^0 then that quadrilateral is cylic quadrilatral.



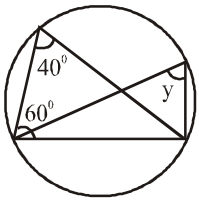
PART - A

1. If the sum of a pair of opposite angles of a quadrilateral is 180^0, then quadrilateral is _____ .
2. A round pizza is cut inot 4 equal pieces. What does each piece represent?
3. AD is a diameter of a circle and AB is a chord if AD=34 cm,

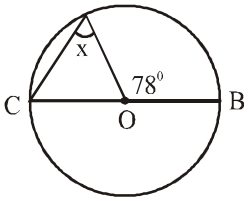
AB=30 cm then find the distance of AB from the centre of chord.

4. Given two concentric circles with centre O. A line cut the circle at A, B, C and D respectively. If AB = 10 cm, then find the length of CD.

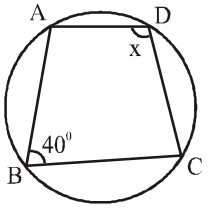
5. Find y in given figure



6. find x



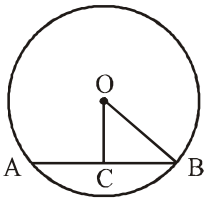
7. Find x



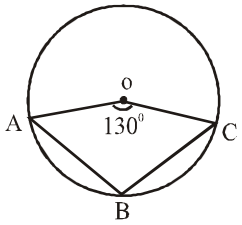
8. Diameter is the _____ Chord of a circle.

9. Circle having the same centre and different radii are called _____ circles.

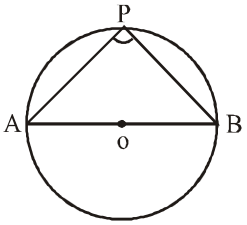
10. In given figure OC is perpendicular segment drawn from centre O on chord AB. If OB = 5 cm, and OC = 3 cm then find length of AB.



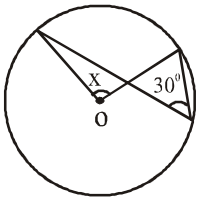
11. In given figure O is centre of circle.
If $\angle AOC = 130^0$ then find $\angle ABC$



12. In given figure AOB is diameter of circle
& P is any point on the circle. Find $\angle APB$.



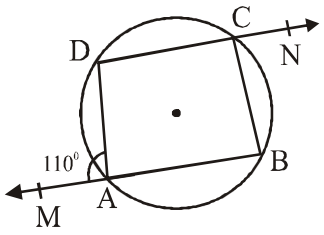
13. Find the value of x in given figure



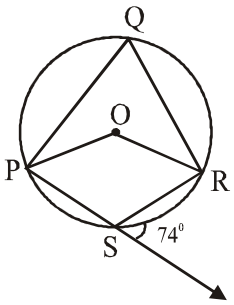
PART - B

14. Prove that cyclic parallelogram is a rectangle.
15. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

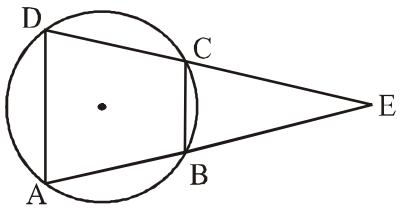
16. In the following figure. Find the value of ∠BCN.



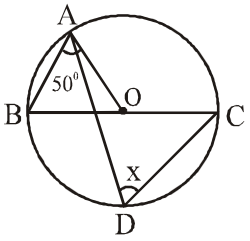
17. In the given figure. Find the value of reflex angle POR.



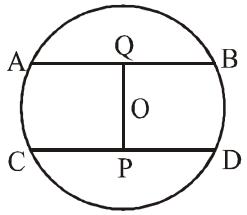
18. In given figure ABCD is a cyclic quadrilateral chords AB and CD are produced to meet E show that EA x EB = EC x ED



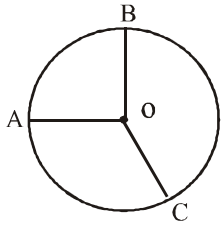
19. Find the value of x in figure if O is centre of circle and ∠OAB = 50^0.



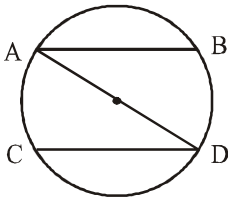
20. In the given figure, O is centre of the circle with radius 5 cm, OP $\perp$ CD, OQ $\perp$ AB, AB || CD, AB = 6 cm and CD = 8 cm. Determine PQ.



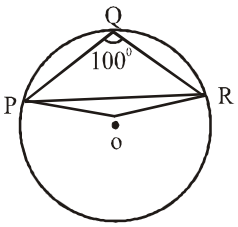
21. In the given figure, O is the centre of a circle, $\angle AOB = 90^0$, $\angle BOC = 120^0$, what is measure of $\angle ABC$.



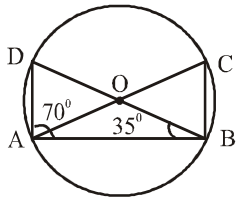
22. In the given figure AB and CD are parallel chords if the length of arc AC = 14 cm. What is length of BD.



23. In given figure $\angle PQR = 100^0$ where P, Q & R are points on the circle with centre O. Find $\angle OPR$.

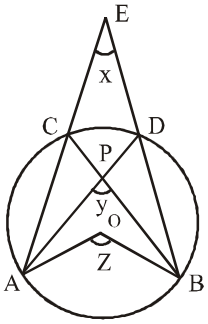


24. In the given figure O is centre of circle, if $\angle ABD = 35^0$ and $\angle BAD = 70^0$ find $\angle ACB$.



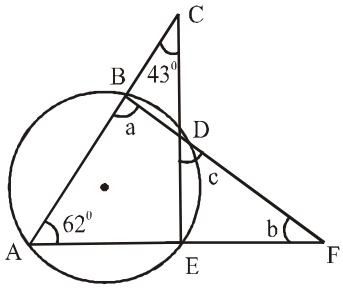
PART - C

25. In the given figure, O is the centre of a circle prove that $\angle x + \angle y = \angle Z$

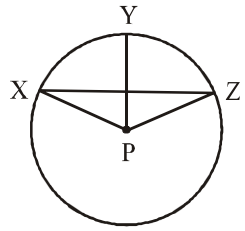


26. If two non parallel sides of a trapezium are equal prove that it is cyclic quadrilateral.

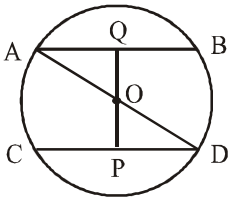
27. In the given figure determine a, b & c if $\angle BAD = 43^0$, $\angle BAF = 62^0$.



28. In the figure P is the centre of the circle prove that $\angle XPZ = 2(\angle XZP + \angle YX Z)$

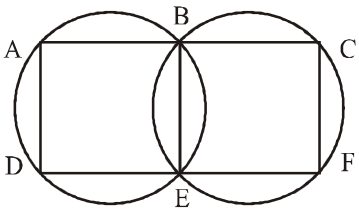


29. In the given figure AD is diameter of the circle whose centre is O and AB ‖ CD prove that AB = CD.

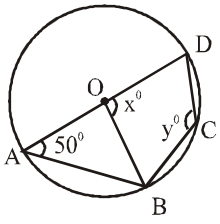


30. In an equilateral triangle, prove that the centroid and the circum centre coincide.

31. In the given figure A, B, C and D, E, F are two sets of collinear points. Prove that AD ‖ CF.



32. In given figure, O is centre of circle and $\angle DAB = 50^0$, calculate the value of x and y.



33. If two equal chords of a circle intersect within the circle prove that the segment of one chord is equal to corresponding segment of other chord.

34. Prove that if a pair of opposite angles of a quadrilateral is supplementary then the quadrilateral is cyclic.

PART - D

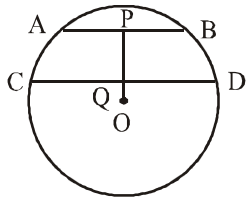
35. Bisector of angle A, B and C of a $\triangle$ABC intersect its circum circle at D, E and F respectively, prove that the angles of a triangle DEF are $90^0 - \frac{1}{2}A$, $90^0 - \frac{1}{2}B$ and $90^0 - \frac{1}{2}C$.

36. Find the sum of the angles in the four segments exterior to a cyclic quadrilateral.

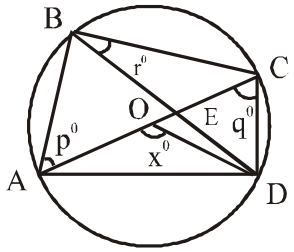
37. Let the vertex of an angle ABC be located outside a circle and let the sides of the angle intersect equal chords AD and CE with the circle. Prove that $\angle$ABC is equal to half the difference of the angles subtended by the chords AC and DE at the centre.

$\angle ABC = \frac{1}{2} / [\angle DOE - \angle AOC]$

38. In the given figure O is centre of the circle of radius 5 cm, OP $\perp$ CD, AB $\parallel$ CD
AB = 6 cm, and CD = 8 cm
Determine PQ



39. In the adjoining figure AC is diameter of a circle with centre O and chord BD $\perp$ AC, intersecting each other at E. Find out the values of p, q, r in terms of x, If $\angle AOD = x^0$, $\angle BAC = p^0$, $\angle ACD = q$.



40. During a practical activity in maths lab students were using circular geo board. The angle subtended by an arc at the centre is $(2a+50^0)$. Pallavi calculated $\angle BAC$ as $(a+25^0)$.

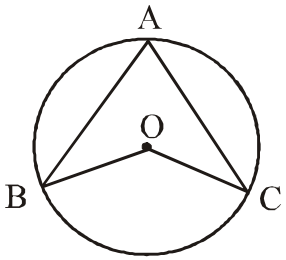
a) Is her finding correct ? Justify it.

b) Find $\angle BAC$ if $a = 30^0$

c) What will be the value of $\angle BOC$ for $a=15^0$

d) Which values are depicted here?

41. 3 STD booths situated at A, B and C as shown in the figure are operated by handicapped persons. These three booths are equidistant from each other.



a) Find $\angle$BOC.

b) Do you think employment provided to handicapped person is important for the development of a society. Justify your answer.

42. Three friends ordered 3 pizzas of the same sized for them. Just then two more friends joined them. They decided to share 3 pizzas among all of them.

a) Find the area of the share of pizza each child gets if the radius of each pizza is 7 cm.

b) Which values of children are dipicted here?

Chapter - 10

Circle

Answers

1. Cyclic quadrilateral
2. Sector
3. 8 cm
4. 10 cm
5. $y = 40^0$
6. $x = 35^0$
7. $x = 140^0$
8. longest
9. Concentric
10. 8 cm
11. 115^0
12. 90^0
13. 60^0
15. 30^0, 150^0
16. 110^0
17. 212^0
19. 50^0
20. 7 cm
21. 75^0
22. 14 cm
23. 10^0
24. 75^0
27. $a = 105^0$, $b=13^0$, $c = 62^0$
32. $x = 100^0$, $y = 130^0$
36. 540^0
38. 1 cm
39. $p = 90 - \frac{1}{2}x$, $q = \frac{1}{2}x$, $r = 90 - \frac{1}{2}x$
40. i) yes
    ii) 55^0
    iii) 80^0
    iv) Truth, scientific temper
41. a) 120^0
    b) yes
42. a) 92.4 cm^2
    b) Co-operation.

Chapter - 11
Constructions

Key Points

Following types of constructions using a ruler and compass are important.

1. Construction of angle of 60^0, 120^0, 30^0, 90^0, etc.
1. Bisecting a given angle i.e. to draw angle bisector.
3. Construction of the perpendicular bisector of a given line segment.
4. Construction of the perpendiculars to a given line from a point on the line or out side the line.
5. Construction of the parallel lines to a given line.
6. Construction of a triangle given its base, a base angle and the sum of the other two sides.
7. Construction of a triangle given its base, a base angle, and the difference of the other two sides.
8. Construction of a triangle given its perimeter and its two base angles.

Questions

1. Draw a line segment of 7.2 cm and bisect it. Also measure each part.
2. Draw perpendicular bisector of AB = 6.4 cm.
3. Draw a line segment PQ = 8 cm. Draw a perpendicular at P.
4. Draw a line AB = 7.9 cm and draw perpendiculars at A and B. Are these two perpendiculars pararallel to each other.
5. Draw an angle $\angle ABC = 32^0$ using protractor. Construct another angle equal to $\angle ABC$ using compass.
6. Construct the angles of the following measurements using compass.
   90^0, $22\frac{1}{2}^0$, 15^0, 75^0, 105^0, 135^0.
7. Construct a rhombus whose side is 3.4 cm and one of its angle is 45^0.
8. Construct $\triangle XYZ$ in which XY = 4.5 cm YZ = 5.0 cm. and ZX = 6.0 cm. Also draw angle bisector of largest angle.
9. Construct an equilateral triangle of side 6 cm. and label its vertices as P, Q. and R. From point Q draw a median QT.
10. Draw a line segment AB = 13.2 cm Find $\frac{1}{4}$ AB using ruler and compass. Write steps of construction.
11. Constrict a right triangle ABC, $\angle B = 90^0$ AB + AC = 10 cm., BC = 6 cm.
12. Construct a $\triangle PQR$ in which QR = 7 cm. $\angle Q = 75^0$ and PQ+PR = 13 cm.
13. Construct a $\triangle PQR$ in which QR = 6 cm, $\angle Q=30^0$ and PQ-PR = 3 cm.

14. Construct a $\triangle XYZ$ in which YZ=4.1 cm. $\angle Y=45^0$, and XY+XZ = 6.7 cm.

15. Construct a $\triangle PQR$ in which QR = 5 cm. $\angle R =45^0$ and PR-PQ = 1.6 cm.

16. Construct a $\triangle XYZ$ in which $\angle Y = 30^0$, $\angle Z = 90^0$ and XY + YZ + ZX = 11 cm.

17. Construct a triangle ABC in which $\angle B = 45^0$, $\angle C=60^0$ and the perpendicular from the vertex A to the base BC is 4.5 cm.

18. Construct a triangle with perimeter 12 cm and ratio of their angles are 2 : 4 : 5

19. Government wish to make an old age home of right triangular shape. If one side is 13m and sum of hypotenuse and other side is 15 m then.

a) Construct the triangle taking measurement in cm.

b) What values are depicted here?

20. Eco club of a school created a triangular park $\triangle ABC$ to maintain greenery of the school. If BC = 7 m, $\angle B=75^0$, AB + AC = 13m. then

a) Construct $\triangle ABC$ taking measurements in cm.

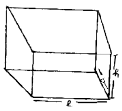
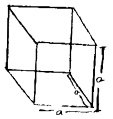
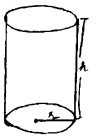
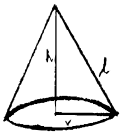
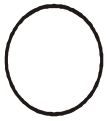
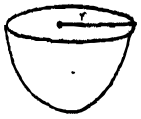
b) What values are represented here.

21. Draw a line ℓ and take a point P which is not on ℓ. From point P draw m $\parallel \ell$

Chapter - 13

Surface Areas and Volumes

Key Points

S.No.	Name	Figure	Lateral/ Curved Surface Area	Total surface Area	Volume	Symbols used for
1.	Cuboid		2 (l+b) x h	2(lb+bh+hl)	lbh	l = length b = breadth h = height
2.	Cube		$4S^2$	$6S^2$	S^3	S = side
3.	Right Circular Cylinder		$2\pi rh$	$2\pi r(h+r)$	$\pi r^2 h$	h = height r = radius of base
4.	Right Circular Cone		πrl	$\pi r(l+r)$	$\frac{1}{3}\pi r^2 h$	r= radious h = height l = slant height
5.	Sphere		$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^3$	r = radius
6.	Hemisphere Solid		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$	r = radius
7.	Hemisphere hollow		$2\pi r^2$	$2\pi r^2$	$\frac{2}{3}\pi r^3$	r = radius

PART - A

Q.1 The lateral surface area of a cube is 256 cm^2 Find its volume.

Q.2 A matchbox measures 4cm x 2.5 cm x 1.5 cm. What will be the volume of a packet containing 12 such boxes?

Q.3 The ratio of height of two cylinders is 5:3 , as well as the ratio of their radii is 2:3. Find the ratio of the volumes of the cylinders.

Q.4 Find the area of canvas required for a conical tent of height 24m and base radius 7m.

Q.5 Find the ratio of total surface area of a sphere and a hemisphere of same radius.

Q.6 The surface area of the cuboid is 1372 sq. cm. If its dimensions are in the ratio of 4:2:1. Then find its length.

Q.7. If the radius and length of a cone are r/2 and 2ℓ. Then find its total surface area.

Q.8. A cone and a hemisphere have equal base and equal volumes. Find the ratio of their heights.

Q.9. The radius of a spherical balloon increase from 6cm to 12 cm as air is being pumped into it. Find the ratio of the surface areas of the balloon in two cases.

Q.10. The largest possible right circular cone is cut out of a cube of edge r cm. What is the volume of cone?

PART - B

Q.11 A roller 1.5m long has a diameter of 70 cm. How many revolutions will it make to level a play ground measuring 50m x 33m?

Q.12. The dimensions of a cuboid are in the ratio of 1:2:3 and its total surface area is $88m^2$. Find its dimensions.

Q.13. A solid cylinder has a total surface area of 231 cm^2. The curved surface area is 2/3 of the total surface area. Find the volume of cylinder.

Q.14. The total surface area of a cube is 150sq. cm. Find the perimeter of any one of its faces.

Q.15. Three metal cubes whose edge measures 3cm, 4cm and 5cm respectively are melted to form a single cube.

Q.16. The length, breadth and height of room are 5m, 4m and 3m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of Rs. 7.50 per m^2.

Q.17. Three spheres of radii 3cm, 4cm and 5cm are melted together to form a single sphere. Find the radius of new sphere.

Q.18. The curved surface area of a cylinder is 176 cm^2 and its base area is $38.5cm^2$. Find the volume of the cylinder.

Q.19. A cylinder and a cone have the same height and the same radius. The volume of the cylinder is $24cm^3$. What will be the volume of the cone?

Q.20 .What is the volume of the largest cone that can be inscribed completely in a hollow hemisphere of radius 7 cm?

PART - C

Q.21 A cuboidal vessel is 10m long and 8m wide. How high must it be made to hold 380m^3 of a liquid.

Q.22. A wall of length 10m was to be built across an open ground. The height of the wall is 4m and thickness of the wall is 24cm. If this wall is to be built up with bricks whose dimensions are 24cm x 10cm x 8cm, how many bricks would be required.

Q.23. 1.1 cm^3 of gold is drawn into a wire of 0.1 mm in diameter. Find the length of the wire in metre.

Q.24. A hemispherical bowl of internal diameter 36cm contain a liquid. This liquid is to be filled in cylindrical bottles of radius 3cm and height 6 cm. How many bottles are required to empty the bowl?.

Q.25. Find the lateral curved surface area of a cylindrical petrol storage tank that is 4.2m in diameter and 4.5m high. How much steel was actually used if 1/12 of steel actually used was wasted in making the closed tank.

Q.26. Water in a canal, 30 dm wide and 12 dm deep is flowing with a speed of 20 km per hour. How much area will it irrigate in 30 min if 9 cm of standing water is desired ? (10dm=1m)

Q.27. The radius of a sphere is 10cm. If the radius is increased by 1cm. then prove that volume of the sphere is increased by 33.1%.

Q.28 The diameter of a hemisphere is decreased by 30%. What will be the percentage change in its total surface area?

Q.29. A sphere and a cube have the same surface area. Find the ratio of their volumes.

Q.30. The volume of a sphere is 4851 cm^3. How much should its radius be reduced so that its volume becomes $\frac{4312}{3} cm^3$?

PART - D

Q.31. A cuboidal tank can store 5040 litres of water. The external dimensions of the tank are 2.2m x 1.7m x 1.7m. If the walls of the tank are 5 cm thick, then what is the thickness of the bottom of the tank?

Q.32. A metallic sheet is of the rectangular shape with dimensions 48cm x 36cm. From each one of its corners, a square of 8cm is cut off. An open box is made of the remaining sheet. Find the volume of the box.

Q.33. A right triangle having sides 6cm, 8cm and 10cm is revolved about the side of length 8cm. Find the volume of the solid so formed.

Q.34. A right circular cone is 5.4 cm high and radius of its base is 2cm. It is melted and recast into another right circular cone with radius of base as 1.5 cm. Find the height of new cone formed.

Q.35. A cylindrical tub of radius 12 cm contains water to the depth of 20cm. A spherical ball is dropped into the tub raising the level of water by 6.75cm. What is the radius of ball?

Q.36. A cylinder is within the cube touching all the virtical faces. A cone is inside the cylinder. If their height are the same with the same base. Find the ratio of their volumes.

Q.37. A plot of land is in the form of rectangle has dimension 240m x 180m. A drainlet 10m wide is dug around it (on the outside)

and the earth dug out is evenly spread out over the plot increasing its surface level by 25cm. Find the depth of the drainlet.

Q.38. A residential colony has a population of 5400 and 60 litres of water is required per person per day. For the effective utilization of rain water, a group of people decided to the WATER HARVESTING. They constructed a water reservoir measuring 48m x 27m x 25m to collect the rain water.

a) For how many days the water of this tank is sufficient if during rain the height of water level is 5 m.

b) Which value is shown by the group of people?

Q.39 50 students of class IX planned a visit to an old age home and to spend the whole day with its inmates. Each one prepared a cylindrical flower vase using card board to gift the inmates. The radius of cylinder is 4.2cm and the height is 11.2 cm.

a) What is the amount spent for purchasing the card board at the rate of ₹ 20 per $100m^2$.

b) What values are depicted by the students?

Q.40. Rahul wanted to make a temporary shelter for street dogs, by making a box like structure with tarpaulin that covers all the four sides and the top of the house. How much tarpaulin would be required to make the shelter of height 2.5 m with base dimensions 4m x 3m. Assuming stitching margin is negligible. Which values are depicted in this question?

Chapter - 13
Surface Areas and Volumes
Answers

1. 512 cm^3
2. 180 cm^2
3. 20 : 27
4. 550 m^2
5. 4 : 3
6. 7 cm
7. $\pi r\left(\frac{l+r}{4}\right)$
8. 2 : 1
9. 1 : 4
10. $V = \frac{1}{12}\pi r^2$
11. 1500
12. 2m, 4m, 6m
13. 269.5 cm^2
14. 20 cm
15. 6 cm
16. ₹ 55
17. 1440 cm^2
18. 308 cm^3
19. 8 cm^3
20. 1359.33 cm^3
21. 4.75 m
22. 5000
23. 140m
24. 1672
25. 59.4m^2, 95.04 m^2
26. 4,00,000 m^2
28. 51 %
29. $\sqrt{6} : \sqrt{5}$
30. 3.5 cm
31. 10 cm
32. 5120 cm^3
33. 288 πcm^3
34. 9.6 cm
35. 9 cm
36. V1 : V2: V3 = 42:33:11
37. 1.227 m
38. 20 days
    Environmental values, cooperation
39. ₹ 3511.20
40. 47 m^2 care for animals

Chapter - 14
Statistics

KEY POINTS

* In statistics we study collection, presentation analysis and interpretation of data.
* Facts or figures collected with a definite purpose are called data.
* The number of times an observation occurs in the given data is called frequency of the observation.
* Classs intervals are the groups in which all observations are divided.
* For class interval 20-30, 30 is called upper class limit and 20 is called lower class limit.
* Class mark = $\frac{\text{Lower class limit + upper class limit}}{2}$
* Average or mean = $\frac{\text{sum of all observations}}{\text{number of observations}}$
* For raw data mean $(\bar{x}) = \frac{\sum_{C=1}^{n} xi}{n}$. Mean $(\bar{x}) = \frac{X_1+X_2 + ... + Xn}{n}$
* When frequency fi is given. $\text{Mean } (\bar{x}) = \frac{\sum_{i=1}^{n} fi\ xi}{\sum_{i=1}^{n} fi}$
* Mode is the value of observation which occurs most frequently.

* For median arrange the data in ascending order or descending orders.

If number of observations ‘n’ is odd

$$\text{median} = \frac{(n+1)^{th}}{2} \text{ term}$$

If number of observations ‘n’ is even

$$\text{median} = \frac{\left(\frac{n}{2}\right)^{th} \text{term} + \left(\frac{n}{2}+1\right)^{th} \text{term}}{2}$$

PART - A

1. The marks of 5 students in a subject out of 50 are 32, 48, 50, 27, 37. Find the range of marks.
2. A data contains 64 as the highest value and its range is 13. What is its lowest value of data?
3. What is the class mark of the class interval 4.7-6.3?
4. If class mark of a class interval is 8.5. The class size is 5. Find the class limits of the corresponding class interval.
5. In a bar graph 0.2 cm length of a bar represents 100 people. What is the length of bar which represents 1300 people?
6. Find the mean of first 5 Prime numbers.
7. The mean of 5 observation is 10. If each observation of data is increased by 5. Find the new mean.
8. If the mean of 10 observations is 15. Find their algebraic sum.
9. The mean of three numbers is 7. If two numbers are 7 and 8. Find the third number.
10. If the mean of 6, 8, 5, 7, x and 4 is 7 then find the value of x.
11. The mode of 4, 9, 5, 4, 9, 5, 4, 9 and x-10 is 9 Find x.
12. If the median of the data arranged in ascending order as 6,9,15, x+4, x+8, x+11, 30, 32 is 19 find x.
13. The mean of the data x_1, x_2, x_3 .... x_n is 10.
    Find mean of $5x_1$, $5x_2$, $5x_3$..... $5x_n$.

PART - B

14. Write the class size and class limits of 104, 114, 124, 134.

15 If the mean of the observations x, 2x+1, 2x+5, 2x+9 is 30. What is mean of last two observations?

15. Find the mean from the following table

xi	5	6	7	8	4
fi	3	2	1	3	2

17. The mean of five numbers is 27. If one of the number is excluded, the mean gets reduced by 2. What is the value of the excluded number?

18. Find the mode of the data 15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 15, 17, 15. If last observation is changed to 14 then find the new mode.

19. If the median of the data arranged in ascending order is 63, find the value of x in the data 29, 32, 48, x-2, x, x+2, 72, 78, 84, 95.

20. The mean monthly salary of 40 workers of a factory is ₹ x in a particular year. Each one was given ₹ 3000 as Diwali Bonus. What will be the mean monthly salary in that month.

21. In the question 20 instead of bonus ₹ 300 be deducted from each workers salary for April to February. What will be their mean monthly salary for December month?

22. For what value of x the mode of the following data is 17. The frequency of x is maximum. 13, 24, 13, 27, 17, 16, 17, x, 22, 21, 13, 17.

23. The average of age of Shikha and her husband Amit is 48 years. The average age of Shikha, Amit and their daughter Advika is 39 years. Find the age of Advika.

24. The mean of 6, 10, 11, x, 12, y is 10. Also y is 7 more than x. Find the value of x and y.

PART - C

25. In three unit tests of Mathematics Priya got 75, 82 and 90 marks. How many marks must she obtain in Unit Test IV to have an average of 85 in all the four unit tests.

26. Time taken in seconds by 25 students in an examation to solve certain question is given below.

    20, 16, 20, 26, 27, 28, 30, 33, 37, 50, 40, 46, 38, 43, 46, 46, 48, 49, 53, 58, 59, 60, 64, 52.

    By taking class interval of 10 seconds, make a frequency distribution table.

27. Find the mean from the following table

xi	5	15	25	35	45
fi	6	4	9	6	5

28. Draw the histogram from the following data

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	15	20	12	16

29. Given below is a cumulative frequency distribution table showing the marks scored by 50 students of a class.

Marks	Number of students
Below 20	17
Below 40	22

Below 60	29
Below 80	37
Below 100	50

Form a frequency table from the above data.

30. Given below are the seats won by differnt

Political parties in the poling out come of a state assembly election.

Political party	A	B	C	D	E	F	G
Seat won	75	55	37	29	10	37	50

Draw a bar graph for above data.

31. Find the value of 'p' from the following distribution if the mean is 6.

xi	2	4	6	10	p+5
fi	3	2	3	1	2

32. Given below is the data of school students who participated in different activities.

Activity	sports	meditation	yoga	walking
No. of girls	42	35	100	120
No. of boys	90	64	130	86

Draw double bar graph.

What values are depicted for these mandatory activitie?

33. The distance travelled by 40 engineers in (km) from 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	12

construct a group frequency distribution table with class size 5 for the data given above taking first interval 0-5 (5 not included)

34. Define the term "Median". If the mediam of 6, 7, x-2, x, 17, 20 written in ascending order is 16. Find the value of x.

PART - D

35. The mean of the following data is 50.

xi	10	30	50	70	90
fi	17	5a+3	32	7a-11	19

Find 'a' and the frequencies for xi = 30, xi = 70

36. Draw a frequency polygon for the following data

Marks	Frequency
0-10	03
10-20	09
20-30	18
30-40	16
40-50	12
50-60	02

37. If the 26 english alphabets are such that A=1, B=2, C=3, ..., Z=26 then find the mean and median of the numbers corresponding to the vowels, which alphabet corresponding to the median.

38. In a school a student who scored 80% or above in his/ her previous class is eligible for "Merit scholarship" Marks obtained by two students Nishi and Vinayak of class IX in their previous class (VIII) in all subjects are given below.

Name	Hindi	English	Maths	Science	SSt.	Skt.
Nishi	78	74	86	85	73	83
Vinayak	79	76	88	83	71	85

Find average percentage score of Nishi and Vinayak which of the two are eligible for merit scholarship?

39. The blood group of 30 students of class IX are recorded as follows.

A, B, B, B, O, B, B, A, AB, A, O, B, O, A, B

AB AB, A, AB, B, A, O, AB, B, A, O, B, AB, A, AB.

a) Make a frequency distribution table for the above data.

b) Mr. 'X' meets an accident and needs blood. His blood group is AB. How many of these students can donate their blod to Mr. 'X' ?

c) How many of the above students are universal donors and universal acceptors?

40. 15 students of Govt. school spend the following numbers of hours in a month for doing cleaning in their street 25, 15, 20, 20, 9, 20, 25, 15, 7, 13, 20, 12, 10, 15, 8

i) Find mean, Median and mode from above data.

ii) Which value is depicted from above information.

41. In an assembly election the number of seats won by the different political parties is shown below.

Party	A	B	C	D	E	F	G
No. of Seats	1	47	15	2	19	1	5

i) Draw a bar graph.

ii) Which political party won by availing maximum number of seats.

iii) What is the minimum age of a voter to cast his/ her vote in India in assembly election?

42. A doctor suggests two ways for treatment of a particular disease one in by taking medicine only and other in by doing meditation and yoga.

Age group	No of patients taking medicines	No of patients doing meditation & yoga
20-30	20	05
30-40	30	12
40-50	42	20
50-60	40	30
60-70	30	20

i) Draw Frequency ploygon for the above data on the same graph.

ii) What is the importance of yoga and meditation in our life?

43. The following tabe gives the distribution of students of two sections according to 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

Represents the marks of both the sections on the same graph by two frequency polygons.

44. The following table shows no of voluntary blood donor as per day in voluntary blood donation camp organazed by Govt. of Delhi.

Days	No. of Donars
Sunday	100
Monday	80
Tuesday	110
Wednesday	80
Thursday	60
Friday	70
Saturday	120

Draw a bar graph showing above informations.

i) In which day donation was maximum and in which day it was minimum.

ii) Why bood donation is neccessary?

Chapter - 14

Statistics / Answers

1. 23
2. 51
3. 5.5
5. 2.6 cm
6. 5.6
7. 15
8. 150
9. 6
10. 12
11. 19
12. 13
13. 50
14. 10, 99-104, 109-119,
15. 37
16. 06
17. 35
18. 15, 14
19. 62
20. x + 3000
22. 17
23. 21 years
24. x = 7, y = 14
26.

15-25	25-35	35-45	45-55	55-65
3	5	5	8	4

27. 25
29.

Class	0-20	20-40	40-60	60-80	80-100
Frequency	17	5	7	8	13

30. Mean 54.8, Median=52, Mode = 52
31. P = 7
32. These activities are best for health
33. Mean 15.6, Median =15, Mode = 20
34. x = 7
35. 5, 28, 24
37. I
38. 70.83, 80.33
39. a) 30, b) 6 c) 8
40. Mean= 15.6, Median =15, Mode = 20, Social Work
44. i) Saturday, Thursday
    ii) Save the others life.

Chapter - 15
Probability
Key Points

Trials - Trial is an action which results in one or several outcomes.

Example -

i) To toss a coin every time, is called a trial

ii) To throw a dice every time is called a trial.

* Probabity of an event E is given by

$$P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of trials}}$$

* The probability of any event always occur between 0 and 1.

$$0 \leq P(E) \leq 1$$

* The probability of any certain event is 1.

$$P(A) = 1$$

* The probability of an impossible event is 0.

$$P(A) = 0.$$

* The sum of probability of all events is 1.

$$P(E) + P(\bar{E}) = 1$$

PART - A

1. What is the sum of the probabilities of happening of an event & not happening of the event?
2. What could be the probability of happing of an event?
3. If the probability of an event to occur is 55%, then what is the probability of non occurence of that event.
4. What is sum of the probabilities of all the possible events of a random experiment?
5. What is the probability of coming a prime number on throwing of a die?
6. A coin in tossed once, what is the probability of getting a tail?
7. A die is tossed once, what is the probability of getting an even number?
8. A bag contains 2 red, 3 green & 1 white ball, what is the probability that the ball picked up is black?
9. In the word MATHEMATICS, what is the probability of choosing a vowel?
10. Out of 35 students of a class, 21 opt automobile engineering & others financial management. What is the probability of choosing a students who took financial management?
11. During an interview for estate manager 15 candidates appeared. Out of which 8 were retired armyman, 4 were retired principals & 3 others from different departments. What is the probability of selecting on armyman for this post?

12. A bag contains slips with numbers between 3 & 32. What is the probability that a slip chosen contains multiples of 4?

PART B

13. Below is the table showing marks secured in mathematics by students of class IX : What is

Marks secured	0-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	0	1	9	10	10	8	5	3	2

i) Probability of getting marks less than 50%

ii) Probability of getting marks 90% & above 90%

14. Cards numbered from 7 to 49 are put in a box & mixed thoroughly. A card is drawn from the box, what is the probability that the number written on it is

i) A prime number

ii) A multiple of 7.

15. The number of hours spent by Ashu, a school student on various activities on a working day are given below :

Activity	sleep	school	H.W.	Tution out of home	Outdoor games	Other acti. at home
No. of Hours	7	7	2	3	3	2

A friend Sonu came to his house to study together. What is the probability that

i) Ashu is available of home.

ii) Ashu's friend will play with Ashu.

16. At a traffic light on 28th April, out of 310 vehicles which crossed the light, 200 were cars, 60 were two wheelers & 50 were autos. 18 were fined for jumping the red light or not wearing of belt or helmet, 5 were fined for using car with odd number, four were left ofter giving warning. What is the probability that.

    i) A car is chosen & it bears even number.

    ii) a fine was given.

17. The following data was collected from an old age home .

Drink	Campa / Soft Drink	Shikanji	Milk	Canned Juice
no. of people	6	10	16	8

What is the probability that a person is chosen & he likes.

i) Natural drink.

ii) Canned Juice

18. There are 35 students in class IX A, 34 in IX B & 33th IX C. If even roll number are allotted project on chapter 2, polynomials & odd roll number are alloted chapter - 1, Number system for project. What is the probability that the student choosen

    i) Prepares project on chapter 1

    ii) Prepares project on chapter 2

19. The probability of guessing the correct answer to a certain questions is $\frac{x}{2}$. If the probability of not guessing correct answer is $\frac{2}{3}$ then find x

20. Following table shows the month of birth of 40 students of a class.

Jan	3	July	2
Feb.	4	Aug.	6
March.	2	Sept.	3
April	2	Octo.	4
May	5	Nov.	4
June	1	Dec.	4

A students is choosen what is the probability that

i) its birth month is november

ii) The month contains 3 days.

21. After a medical check for HB level of 35 students of class IX following data was recorded.

HB	Below 8	Below 10	Below 12	Below 14	Below 16
No. of Students	3	7	13	23	35

What is the probability that a student choosen has

i) HB level less than 10.

ii) HB level greater than or equal to 12 but less than 16.

22. To know the opinion of 35 students about sixth subject as automobile engineering or financial management a survey was done. The data is recorded in the following table in favour of choosing automobile engineers.

No. of student like	20
Dislike	15

Find the probability that a student will opt

(i) automobile engineering

(ii) Financial management.

23. A die is thrown 100 times by a player during a game. The data is recorded in the table given below.

Outcome	1	2	3	4	5	6
Frequency	20	12	18	19	16	15

A player will get one more chance if he gets 1 or 6 & looses his /her next chance if 3 or 5 comes.

i) What is the probability of loosing the next chance.

ii) What is the probability of getting one more chance.

24. Following is the table showing marks obtained by 200 students out of 100 in an examination.

Marks	No. of students
0-10	20
10-20	40
20-30	15
30-40	24
40-50	25
50-60	12
60-70	9
70-80	7
80-90	12
90-100	36

Find the probability that a student chosen.

i) Obtained less than 40 marks

ii) Obtained greater than or equal to 60 but less than 80.

iii) Obtained 80 & above.

25. Mathematics book of class IX contains 15 chapters. A maths teacher asked one of the students to write the name of each chapter on slips, One name on one slip. She mixed the slips

thoroughly in a box.

She called a student to pick up one of the slips. What is the probability that the chapter written on it is from

(i) Geometry (ii) Algebra

What values of teacher are shown here.

PART - D

26. ABCD is a quadrilatral whose diagonal AC biseets it into two triangles equal in areas. Find the probability that the quadrilateral chosen has

i) All the angles are right angles.

ii) both the diagonals bisect each other.

iii) diagonals are perpendicular to each other.

iv) only one of the diagonal bisect the other.

27. A survey was done on 2400 families to determine a relationship between income level & number of vehicles in a family. The recornded data is given below.

Monthly Income (₹)	Vehicles per family			
	0	1	2	above 2
Less than 15000	20	150	25	0
15000-20000	0	305	27	2
20000-25000	2	535	28	1
25000-30000	3	468	59	25
30000 & above	1	579	82	88

If a family is chosen find the probability that the family is.

i) earning ₹ 20000-25000 per month owning exactly 2 vehicles.

ii) earning ₹ 30000 & above per month & owning more than 2 vehicles.

iii) earning less than ₹ 15000 per month & owning at least 1 vehicles.

28. The following table shows per day salary of 1000 workers.

Salary Per Day (₹)	500-700	701-900	901-1100	1101-1300
No. of Workers	280	175	420	125

It a worker is chosen at random, find the probability that he is getting.

i) at least ₹ 701 dailay

ii) at most ₹ 900 daily

iii) at the most ₹ 1300 daily

29. $\text{BMI} = \dfrac{\text{Mass in Kg.}}{(\text{height in metres})^2}$

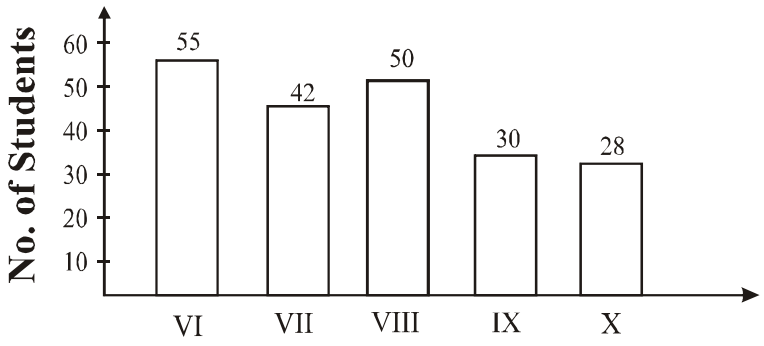
The following table shows the BMI of different categories

	Category	BMI (kg/m^2)
1.	Under weight	16.0-18.5
2.	Normal weight	18.5-25.0
3.	Over weight	25.0-30.0
4.	Obesity	above 30.0

Three persons x, y, z have the same height 170 cm and their masses are 70 kg., 85 kg. & 65 kg. respectively.
Find the probability that a person choosen has lowest BMI.

30. Read the lines carefully
Horse is horse, of course, of course.
And no one can talk to horse of course
That is , of course, unless the horse is the famous mister Id.
Find the probability of the word ‘ course’ from the above stanza.
Name the word which has the same probability as the word ‘course’ has.

31. The bar graph below shows the number of students in different classes of a school.



In the annual function of primary classes, class IX & X was deputed for discipline duty, students of class VII & VIII for sitting, class VI students were to welcome the chief guests.

Find the probability that a student chosen is

i) deputed for sitting.

ii) a student of class X.

iii) deputed for welcome of chief guest.

32. In a park, there is a right angled triangular flower bed. It's two small sides are 5 cm & 12 cm respectively. Along its three sides at a distance of 1/2 m each plants of different types are to be planted. Rose plants are to be planted along the shortest side, Marigold plants are to be planted along the longest side & sunflower plant along the third side at each of the vertex a different type of flower plant is to be planted. Find the probabilities of the following.

i) Number of flower plants on the longest side.

ii) number of sun flower plants.

33. Out of 1000 small coloured bulbs $81^{\frac{3}{2}}$ are of white colour, 5^3 are red coloured, 2^6 are green coloured & rest are blue coloured. What is the probability that a bulb is chosen & is.

i) blue coloured.

ii) red coloured

iii) white coloured.

Chapter-15

Probability / Answers

1. one
2. $o \leq P(E) \leq 1$
3. 45%
4. one
5. $\frac{1}{2}$
6. $\frac{1}{2}$
7. $\frac{1}{2}$
8. Zero
9. $\frac{4}{11}$
10. $\frac{14}{35}=\frac{2}{5}$
11. $\frac{8}{15}$
12. $\frac{7}{30}$
13. (i) $\frac{20}{48}$ (ii) $\frac{2}{48}$ (iii) 0
14. $\frac{11}{43}$ $\begin{pmatrix}7, 11, 13, 17, 23, 29\\31, 37, 41, 43, 47\end{pmatrix}$
15. (i) $\frac{11}{24}$ (ii) $\frac{3}{24}$
16. (i) $\frac{195}{200}$ (ii) $\frac{23}{310}$
17. (i) $\frac{26}{40}$ (ii) $\frac{8}{40}$
18. (i) $\frac{52}{102}$ (ii) $\frac{50}{102}$
19. (i) $\frac{2}{3}$
20. (i) $\frac{1}{12}$ (ii) $\frac{7}{12}$
21. (i) $\frac{10}{35}$ (ii) $\frac{22}{35}$
22. (i) $\frac{20}{35}$ (ii) $\frac{15}{35}$
23. (i) $\frac{34}{100}$ (ii) $\frac{35}{100}$
24. (i) $\frac{99}{200}$ (ii) $\frac{16}{200}$ (iii) $\frac{48}{200}$
25. (i) $\frac{7}{15}$ (ii) $\frac{2}{15}$
    iii) Creating interest among students through activity.
26. (i) $\frac{2}{5}$ (ii) $\frac{4}{5}$ (iii) $\frac{3}{5}$
    (iv) $\frac{1}{5}$
27. (i) $\frac{7}{600}$ (ii) $\frac{11}{300}$ (iii) $\frac{7}{96}$
28. (i) $\frac{720}{1000}$ (ii) $\frac{455}{1000}$ (iii) 1
29. (i) $\frac{1}{3}$
30. (i) $\frac{1}{7}$ (ii) Horse
31. (i) $\frac{92}{205}$ (ii) $\frac{28}{205}$ (iii) $\frac{55}{205}$
32. (i) $\frac{26}{60}$ (ii) $\frac{24}{60}$
33. (i) $\frac{82}{1000}$ (ii) $\frac{125}{1000}$ (iii) $\frac{729}{1000}$

Summative Assessment - II
Subject : Mathematics
Class : IX

Time : 3 hrs. **M.M.90**

General Instructions :

(i) All questions are compulsory.

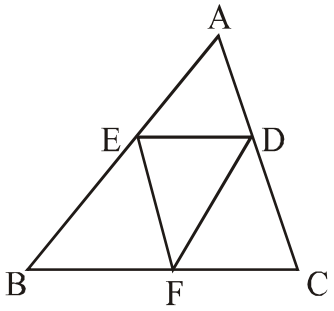
(ii) The question paper consists of 31 questions divided into five sections A,B,C,D and E. Section 'A' comprises of 4 questions of 1 mark each; section 'B' comprises of 6 questions of 2 marks each; section 'C' comprises of 8 questions of 3 marks each and section 'D' comprises of 10 questions of 4 marks each. Section 'E' comprises of two questions of 3 marks each and 1 question of 4 marks from Open Text theme.

(iii) There is no overall choice.

(iv) Use of calculator is not permitted.

SECTION 'A'

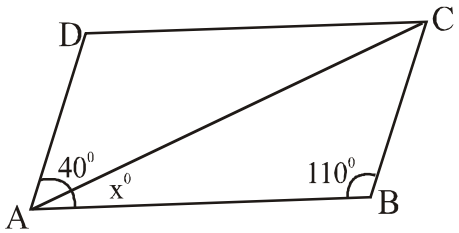
1. In the figure, points, D, E and F are the mid-points of the sides AC, AB and BC of a $\triangle$ABC. If AB = 4.2cm, BC=5.6cm and AC=3.6cm, then find the perimeter of $\triangle$DEF.



2. If the volume and surface area of a sphere are numerically equal, then find the radius of the sphere.
3. Find the class mark of the class 120-150.
4. Find the mean of first five prime numbers.

SECTION 'B'

5. In $\triangle$PQR, base QR is divided at X such that QX = $\frac{1}{2}$ XR. Prove that ar ($\triangle$PQX) = $\frac{1}{3}$ ar ($\triangle$PQR).
6. If diagonals of a cyclic quadrilateral are diameters of the circle through the opposite vertices of the quadrilateral, prove that the quadrilateral is a rectangle.
7. In the figure, ABCD is a parallelogram with $\angle B = 110^0$. Find the value of x.



8. The volume of a cone with circular base is $216\pi cm^3$. If the base radius is 9cm, the find the height of the cone.
9. To know the opinion of the students about the subject statistics, a survey on 350 students was conducted. The data recorded is as shown below :

Opinion	Number of students
Like	147
Dislike	203

Find the probalility that a student chosen at random
(i) like statistics.
(ii) dislikes statistics.

10. A dice is rolled a number of times and its outcomes are recorded as below:

Outcome	1	2	3	4	5	6
Frequency	35	45	50	38	53	29

Find the probability of getting an odd number.

SECTION 'C'

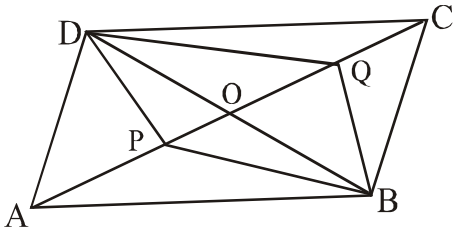
11. Convert the following frequency distribution into a continuous grouped frequency distribution.

Class	150-153	154-157	158-161	162-165	166-169
Frequency	6	9	15	10	5

12. Draw a histogram for the following data :

Class	1-4	4-6	6-8	8-12	12-20
Frequency	6	30	40	16	4

13. In the given figure, Pand Q are any two points on the diagonals AC of the parallelogram ABCD. Show that ar ($\triangle$PDQ) = ar ($\triangle$PBQ).



14. If two chords of a circle with a common end-point are inclined equally to the diameter through the common end-point, prove that the chords are equal.

15. Construct a squre of side 6.5 cm.

16. PQRS is a quadrilateral whose diagonals bisect each other at right angles. Prove the PQRS is a rhombus.

17. Draw a line segment PQ of measure 7cm. Construct its perpendicular bisector.

18. A heap of paddy is in the form of a cone whose radius is 2.1m and stant height is 3.5m. If the heap is to be covered exactly by a canvas to protect it from rain, Then find the area of the canvas required. $\left(\text{Use } \pi = \frac{22}{7}\right)$

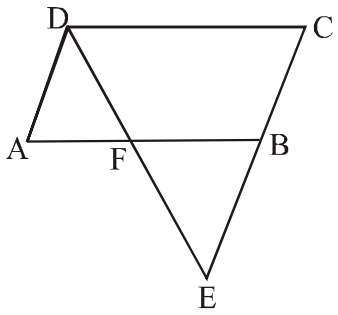
SECTION 'D'

Question numbers 19 to 28 carry four marks each.

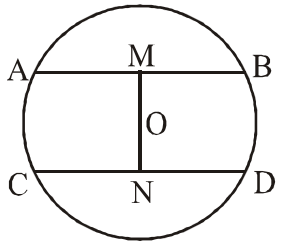
19. Find the sum of median and mode of the following marks obtained by some students in an examiantion.

41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 60, 40, 42, 52

20. In the given figure, ABCD is a parallelogram in which CB is produced to E such that BC=BE. The line segment DE intersects side AB at F. If ar ($\triangle$ADF)=4 cm^2, find the area of parallelogram ABCD.

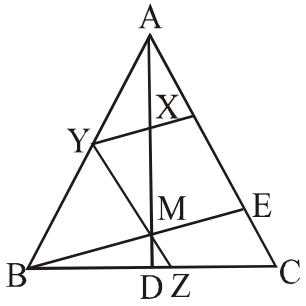


21. In the given figure, AB and CD are two parallel chords of a circle which are on the opposite sides of the centre O such that AB=16 cm and CD=12 cm and the distance between them is 14cm. Find the radius of the circle.



22. Construct $\triangle$KLM, if its perimeter is 10.5cm, $\angle$L=120^0 and $\angle$M=30^0.

23. In $\triangle$ABC, BE $\perp$ AC, AD is any line drawn from A to BC intersecting BE in M as shown in the figure. X, Y and Z are respectively the mid-point of AM, AB and BC. Prove that $\angle$XYZ=90^0.



24. A group of 21 school students shared a ice-cream brick in lunch break to celebrate independence day. If each one takes a hemispherical scoop of ice-cream of 3 cm radius, find the volume of ice-cream eaten by them.

(a) If the dimensions of the ice-cream brick are 10cmx 10cm x 12 cm, how much volume of ice-cream is left?

(b) Which value is depicted by students? $\left(\text{Use } \pi = \frac{22}{7}\right)$

25. A cubicle water tank is filled by tap water at the rate of 1.44 litres per second. Find the length of an edge of the tank in centimetres, if the tank is completely filled in 20 minutes.

26. It costs ₹ 2200 to paint the inner curved surface of a cylindrical vessel 10m high at the rate of ₹ 20 per sq. metre. Calculate the inner surface area and the capacity of the vessel $\left(\text{Use } \pi = \frac{22}{7}\right)$.

27. The height, curved surface area and volume of a cone are h, c and v respectively. Prove that $3\pi vh^3 - c^2h^2 + 9v^2 = 0$.

28. In class IX of 50 students, number of students opting for second language is as follows :

Sanskrit - 14 Japanese - 08 French - 12 Urdu - 6

Rest of them opted for German. A student is selected at random. Find the probalsility that the student selected.

a) Opts for french

b) does not opts for Japanese

c) either opts for Sanskrit or for German.

Answer Key

SA - II

1. 6cm
2. r=3 units
3. 13.5
4. 5.6
7. x=30
8. h=8cm
9. $\frac{21}{50}, \frac{29}{50}$
10. $\frac{69}{125}$
11. $\frac{6}{7}$
18. 23.1m^2
19. 50+52=102
20. Area = 16cm^2
21. r=10cm
24. (a) 1188 cm^3
    (b) 12cm^3
    (c) Sharing
25. 120 cm
26. 110m^2, 96.25m^3
28. $\frac{6}{25}, \frac{21}{25}, \frac{12}{25}$

Summative Assessment - II
Subject : Mathematics
Class : IX
SAMPLE QUESTION PAPER

Time : 3 hrs. **M.M.90**

General Instructions :

(i) All questions are compulsory.

(ii) The question paper consists of 31 questions divided into five sections A,B,C,D and E. Section 'A' comprises of 4 questions of 1 mark each; section 'B' comprises of 6 questions of 2 marks each; section 'C' comprises of 8 questions of 3 marks each and section 'D' comprises of 10 questions of 4 marks each. Section 'E' comprises of two questions of 3 marks each and 1 question of 4 marks from Open Text theme.

(iii) There is no overall choice.

(iv) Use of calculator is not permitted.

SECTION 'A'

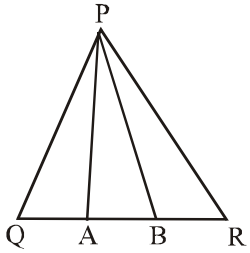
1. Height corresponding to side AB of a Parellelogram ABCD is 12cm. If length of AB is 10cm find ar (ABCD).
2. A cylinder of base radius r and height h is dipped vertically to half the height in a bucket full of purple paint. Find the area of the surface which gets painted.
3. The class mark of a class interval is 10.5 and its class size is

7. Find the class interval.

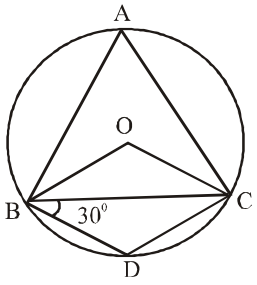
4. Find the median of the numbers 10, 12, 14, 16, 18, 20.

SECTION 'B'

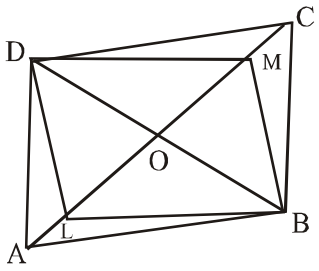
5. In $\triangle$PQR, A and B are points on side QR such that QA=AB=BR. Prove that ar ($\triangle$PQB)=ar ($\triangle$PQA)+ ar ($\triangle$PBR).



6. In the given figure, O is the centre of the circle. If BD=DC and $\angle$DBC=30^0, find the measure of $\angle$BAC.



7. In the figure, ABCD is a parallelogram diagonals AC and BD meet at the point O. L and M are points on AC such that AL=CM. Show that BMDL is a parallelogram.



8. The diameter of a metallic ball is 4.2cm. If the dinsity of the metal is 8.9g per cm^3, find the mass of the ball.

$\left(\text{Use } \pi = \frac{22}{7}\right)$.

9. A dice is rolled 250 times and its outcomes are recorded as below:

Outcome	1	2	3	4	5	6
Frequency	40	45	35	38	52	40

Find the probability of getting :

(i) An odd number

(ii) A multiple of 5

10. The blood groups of some students of class IX are recorded as below :

Blood Group	A	B	AB	O
No. of students	19	6	13	12

If a student is chosen at random, find the probability taht he/ she has blood group A or AB.

SECTION 'C'

11. Make a frequency table of equal class size for the following

marks obtained by 25 students of class IX in which the first two classes are 1-5 and 6-10 :

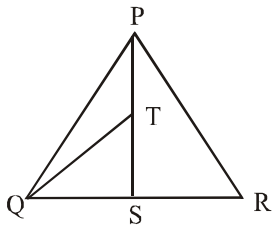
5, 20, 6, 2, 3, 7, 10, 8, 5, 20, 23, 18, 4, 6, 10, 6, 5, 7, 3, 9, 11, 15, 16, 20, 6.

12. The following table shows the marks obtained by 90 students in a mathematics examination :

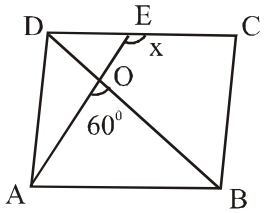
Marks	0-20	20-30	30-40	40-50	50-60	60-70
No. of Students.	7	10	10	20	20	23

Represent the data by a histogram.

13. In $\triangle$PQR, point T is the mid-point of its median PS as shown in the given figure. Show that ar ($\triangle$PQT) = $\frac{1}{4}$ ar ($\triangle$PQR).

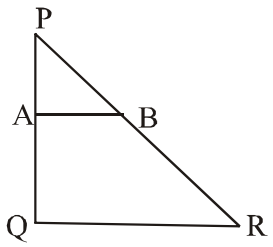


14. In the given figure, ABCD is a square. A line segment AE intersects the diagonal BD at O such that $\angle$AQB=60^0. Find the measure of angle x.



15. Construct a rhombus whose each side measures 5cm and one of its angles is of 60^0.

16. In the given figure, $\triangle$PQR is right angled at Q. A and B are the mid-points of sides PQ and PR respectively. If PQ=10cm and PR=26cm, then find the length of AB.



17. Prove that equal chords of a circle subtend equal angles at the centre.

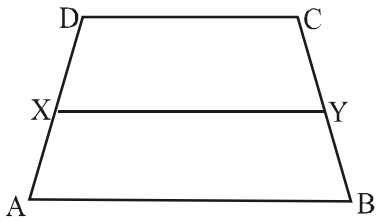
18. A spherical metallic shell with 10 cm external diameter weight $1789\frac{1}{3}$g. Find the thickness of the shell, if the density of the metal is 7g/cm^3. $\left(\text{Use } \pi = \frac{22}{7}\right)$.

Section - D

19. Find the mean and mode for the following frequency distribution :

Marsk	5	15	20	35	40	45	50	60
No. of Students	7	10	6	8	12	3	5	4

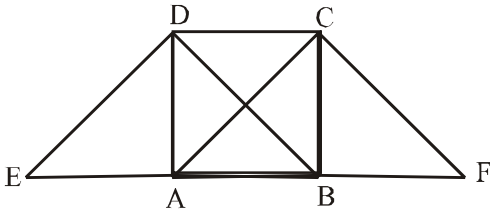
20. ABCD is a trapezium with AB $\parallel$ DC. X and Y are mid-points of sides AD and BC respectively. If CD=30cm and AB=50 cm, show that ar (DCYX) = $\frac{7}{9}$ ar (XYBA).



21. PQ and RS are two parallel chords of a circle whose centre is O and radius is 10cm. If PQ=16 cm and RS=12, find the distance between PQ and RS when they lie :
    (a) on the same side of centre O.
    (b) on the opposite sides of centre O.

22. Construct a $\triangle ABC$ in which $\angle B=60^0$, $\angle C=45^0$ and AC+AB+BC=8.5cm.

23. In the given figure, ABCD is a square, Side AB is produced to points E and F in such a way that EA=AB=BF. Prove that :
    (i) DE = DB
    (ii) CA = CF



24. The "Caring old people organisation" needs money to build the old age home which requires 164000 bricks. Bricks measure 10cm x 8cm x 4cm and cost of bricks depends on their volume at the rate of ₹ 1 per 100 cm3. It requires 4 cylindrical cans of paint of radius 14 cm and height 30cm. The cost of paint is ₹ 1 per 20 cm^3. How much money is required by the organisation? If "company A gives the money

to the organization", then what common values are depicted by company A and the organisation? $\left(\text{Use } \pi = \frac{22}{7}\right)$.

25. Find the percentage decrease in the curved surface area of a sphere, if its diameter is decreased by 25%.

26. The graphite lead of diameter 1 mm is inserted in a pencil (cylindrical) with base diameter 7mm. If the length of the pencil is 14cm, find the volume of wood and the volume of graphite. $\left(\text{Use } \pi = \frac{22}{7}\right)$

27. Length, breadth and height of a cuboidal box are in the ratio 2:3:4. The difference of the costs of wrapping the surface of this box with paper at the rates of ₹ 4.50 per m^2 and ₹ 4 per m^2 is ₹ 416. Find the length, breadth and height of the box.

28. A parent has collected data of number of schools based on the monthly fees, so that he can choose the school for admission of his child. Data is as follows :

Monthly Fee in ₹	250-500	500-750	750-1000	1000-1250	1250-1500	1500-1750	1750-2000
No. of schools	14	16	18	12	14	8	8

If a school is selected at random, find the probability that the school is having

(i) minimum fee

(ii) maximum fee.

(iii) fee less than ₹1000

(iv) Fee ₹ 1000 or more but less than ₹ 1500.

Summative Assessment - II
Subject : Mathematics
Class : IX
SAMPLE QUESTION PAPER

Time : 3 hrs. **M.M.90**

General Instructions :

(i) All questions are compulsory.

(ii) The question paper consists of 31 questions divided into five sections A,B,C,D and E. Section 'A' comprises of 4 questions of 1 mark each; section 'B' comprises of 6 questions of 2 marks each; section 'C' comprises of 8 questions of 3 marks each and section 'D' comprises of 10 questions of 4 marks each. Section 'E' comprises of two questions of 3 marks each and 1 question of 4 marks from Open Text theme.

(iii) There is no overall choice.

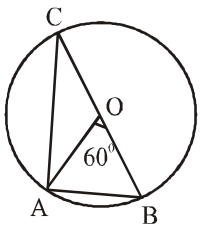
(iv) Use of calculator is not permitted.

SECTION 'A'

1. If $2x + ky = 10k$, intersects x-axis at (2,0), find k.
2. Express $x + 2=0$ in the form of $ax + by + c = 0$.
3. A triangle and parallelogram are on the same base and between the same parallels. If altitude of triangle is 4 cm and its area is 8 cm^2, find the length of base of parallelogram.

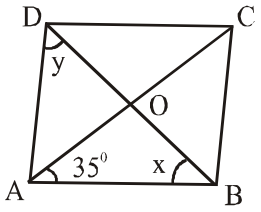
SECTION 'B'

5. In the given figure, O is the centre of the circle. If $\angle AOB=60^0$. Find the measures of $\angle AOC$ and $\angle ABC$.



6. Using protractor, draw $\angle DEF=60^0$. Construct another angle equal to $\angle DEF$ using compass.

7. In the figure, ABCD is a rhombus whose diagonals meet at O. Find the values of x and y.



8. A solid right circular cylinder has radius 14 cm and height 8cm. Find its curved surface area and total surface area.

9. In a class probability that students are in uniform is $\frac{23}{30}$. Find the probability that students are not in uniform.

10. A coin is tossed 150 times and the outcomes are recorded as follows :

Outcomes	H	T
Frequency	85	65

Compute the probability of

(i) one head

(ii) one tail.

SECTION 'C'

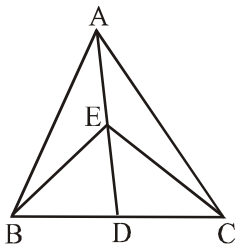
11. Write the equation of a line which is parallel to x-axis and is at a distance of 2 units below x-axis. Represent this graphically also.

12. The auto fare in a city are as follows: For the first kilometer it is ₹ 10 and for subsequent distance it is ₹ 8 per km. Taking the distance as y km and total fare as ₹ x, write a linear equation for this and draw the graph. Also find the fare of 15 km.

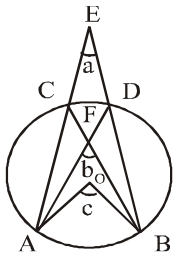
13. $\triangle$PQR is right angled at Q. A and B are the mid-points of sides PQ and PR respectively. If PQ=10 cm and PR=26cm, then find the length of AB.

14. Construct $\triangle$KLM in which KL +LM+MK = 15cm. $\angle L=90^0$ and $\angle M=30^0$.

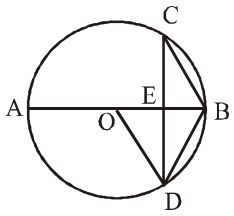
15. In a triangle ABC, E is mid-point of median AD. Prove that ar ($\triangle$BED) = ar ($\triangle$AEC).



16. In the given figure, O is the centre of the circle. Prove that $\angle a+\angle b=\angle c$.



17. In the given figure, if O is the centre of the circle, BD=OD and CD $\perp$ AB, find $\angle$CAB and $\angle$BCD.



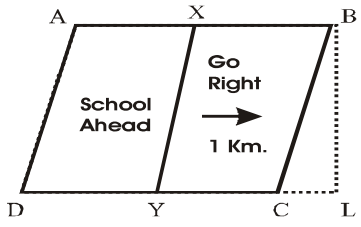
18. There is a solid cube which has been cut into two cuboids of equal volumes. Find the ratio of the total surface area of one of the cuboids to that of the given cube.

SECTION 'D'

19. Draw the graphs of the following equations on the same sheet : x=0, y=0, x+y=4.
    Also, find the area enclosed between these lines.

20. Angles of a triangle are x, 2x and y. Write a linear quation which satisfies this data. Draw the graph for the same.

21.



In order to guide and help people in reaching school without any problem of finding the way to school, students of the school decided to put up a sign board on main road. The sign board ABCD is in shape of a parallelogram as shown in figure.

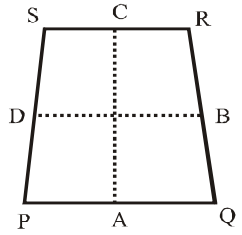
(a) If X and Y are the mid-points of sides AB and CD respectively, show that ar (AXYD)= ar (BXYC).

(b) What can you say about this gesture of the students?

22. Draw a line segment AB = 12.4cm. Find $\frac{1}{4}$ AB using ruler and compass. Write steps of construction.

23. Prove that a quadrilateral formed by bisectors of interior angles of a quadrilateral is a cyclic quadrilateral.

24. In the figure, PQRS is a quadrilateral in which A,B, C and D are mid - points of the sides PQ, QR, RS and PS respectively. Show that AC and BD bisect each other.



25. The frame of a lampshade is cylindrical in shape. It has base diameter 28cm and height 17 cm. It is to be covered with a decorative cloth. A margin of 2 cm is to be given for folding it over top and bottom of the frame. If $\frac{1}{12}$ of cloth is wasted in cutting and pasting, find how much cloth is required to be purchased for covering the frame.

26. A fruit tin has a square base with side 14 cm and height 18.5cm. Another cylindrical tin has a diameter of the base 14cm and

height 17.5cm. Which tin has more capacity and by how much?

27. The volume of a right circular cone is $100\pi cm^3$ and its height is 12 cm. Find its slant height and hence its curved surface area.

28. A coin is tossed for a certain number of times. If the probability of getting a head is 0.4 and the head appeared up for 24 times, find the number of times the coin was tossed. Hence, find the probability of getting a tail and verify that P(H) + P(T) = 1