

**SUB:- MATHEMATICS REVISION SHEET**

**NUMBER SYSTEMS**

1. Find three rational numbers between  $2/7$  and  $3/7$
2. Find two irrational numbers whose:
  - (i) product is an irrational number
  - (ii) quotient is an irrational number.
  - (iii) quotient is a rational number.
  - (iv) difference is a rational number
  - (v) product is a rational number
3. Find two rational numbers in the form  $p/q$  between  $0.343443444344443.....$  and  $0.363663666366663....$
4. Express  $1.3\bar{2} + 0.3\bar{5}$  as a fraction in the simplest form.
5. If  $x = 3 + 2\sqrt{2}$ , find out whether  $x - 1/x$  is rational or irrational.
6. Simplify:
  - (i)  $\frac{2\sqrt{3}}{\sqrt{3}-\sqrt{2}} + \frac{3\sqrt{2}}{\sqrt{3}+\sqrt{2}}$
  - (ii)  $\frac{7\sqrt{3}-5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$
  - (iii)  $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$
7. Represent  $\sqrt{8.4}$  geometrically on the number line.
8. If  $x = \frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}+\sqrt{2}}$  and  $y = \frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$ , find the value of  $x^2 + xy + y^2$
9. Find the value of :  $\frac{4}{216^{\frac{-2}{3}}} + \frac{1}{256^{\frac{-3}{4}}} + \frac{2}{243^{\frac{-1}{5}}}$
10. Show that :  $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c = 1$

**POLYNOMIALS**

1. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answers.
  - (i)  $x^3 + x$
  - (ii)  $x + 2/x + 3$
  - (iii)  $\sqrt{3}x + 1$
  - (iv)  $a^{10} - b^5 + c$
  - (v)  $2\sqrt{y} + 3y$
2. Write the degree of a zero polynomial.

3. Determine the degree:

(i)  $(x-1)(x-2x^2+3)$  (ii)  $y^3(1-y^4)$  (iii)  $\frac{1}{x^2}(x^3-x^4+x^8)$

4. If  $p(x) = x^2 - 4x + 3$ , evaluate  $p(2) - p(-1) + p(1/2)$

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

6. Factorise:

(i)  $(1+3y)^2 + (9y^2 - 1)$

(ii)  $x^8 - y^8$

(iii)  $25x^3y - 121xy^3$

(iv)  $343a^3 - 729b^3$

(v)  $(3p-q)^3 + (q+2r)^3 - (2r+3p)^3$

7. If  $a + b + c = 8$  and  $a^2 + b^2 + c^2 = 34$ , find the value of  $a^3 + b^3 + c^3 - 3abc$ . (Ans : 152)

8. Show that  $(x-2)$  is a factor of the polynomial  $f(x) = 2x^3 - 3x^2 - 17x + 30$  and hence factorise  $f(x)$ .

9. If  $x + \frac{1}{x} = \sqrt{5}$ , find the value of  $x^4 + \frac{1}{x^4}$  (Ans: 7)

10. If  $x^2 + \frac{1}{x^2} = 146$ , find the value of  $x^3 - \frac{1}{x^3}$  (Ans: 1764)

11. If  $x + y = 8$ ,  $xy = 15$ , then find the value of  $x^4 + x^2y^2 + y^4$  Ans(931)

12. If  $p + q + r = 16$  and  $pq + qr + rp = 25$ , find the value of  $p^2 + q^2 + r^2$  Ans(206)

## COORDINATE GEOMETRY

Q1. In which quadrant or on which axis do each of the following point lie :

Verify your answer by locating them on the Cartesian plane.

(i)  $(-2, 4)$

(ii)  $(-1, 0)$

(iii)  $(1, 2)$

(iv)  $(-3, -5)$

(v)  $(0, -4)$

(vi)  $(5, 0)$

Q2. Find the mirror image of the following points with respect to (a) x axis (b) y axis

(i)  $(-2, 3)$

(ii)  $(-1, -2)$

(iii)  $(-5, 8)$

(iv)  $(-9, 5)$

(v)  $(1, -8)$

Q3. Plot the points A  $(0, 5)$ , B  $(8, 0)$ , C  $(8, 5)$  and join them. What figure do you obtain ?

Q4. Plot the following points and check whether they are collinear or not.

(i)  $(1, 3)$ ,  $(-1, -1)$  and  $(-2, -3)$

(ii)  $(0, 1)$ ,  $(2, -2)$  and  $(\frac{2}{3}, 0)$

Q5. Plot the point P  $(-4, 5)$ . Draw PM and PN perpendiculars to x-axis and y-axis respectively. State the coordinates of the points M and N.

Q6. Plot the points P  $(1, 0)$ , Q  $(5, 0)$  and S  $(1, 4)$ . Find the coordinates of the fourth point R, such that PQRS forms a square. Also plot the mirror images of P, Q, R and S with respect to x-axis.

Q7. Plot the points  $(0, 0)$ ,  $(3, 0)$ ,  $(3, 2)$  and  $(0, 2)$ . Join them in order. Name the type of quadrilateral, based on your observation.

Q8. Write the coordinates of the vertices of a rectangle which is 6 units long and 4 units wide if the rectangle is in the first quadrant, its longer side lies on the x-axis and one vertex is at the origin.

### LINEAR EQUATIONS IN TWO VARIABLES

1. Write each of the following as an equation in two variables. Also determine the values of a, b and c.

(i)  $x = 7$

(ii)  $2y = -5$

2. Find two solutions for the following equations :

(i)  $2x + 5y = 9$

(ii)  $5x + 3y = 14$

3. Find three different solutions of the equation  $4x+3y= 12$  from its graph.

4. Find the value of a so that each of the following equations may have  $x = 1, y = 1$  as a solution:

(i)  $ax - 2y = 10$

(ii)  $9ax + 12ay = 63$

5. Solve the equation  $3(x+2) = 2(2x-1)$  and represent the solution on

(i) the number line

(ii) the Cartesian plane

6. Draw the time-distance graph for a car moving at a uniform speed of 60km per hour. From the graph, find the distance travelled in  $\frac{1}{2}$  hour and  $2\frac{1}{2}$  hours.

7. A pen costs ₹ 10 and a pencil costs ₹ 2. Write an equation that represents the total money spent on buying different combinations of pens and pencils, if the total money spent is ₹ 110. Draw the graph of this equation.

8. Give the equations of two lines passing through  $(-7, 11)$ . How many more such lines are there and why?

9. Draw the graph of  $x+y=3$  and  $2x+2y=8$  on the same axes. What does the graph of these lines represent?

### INTRODUCTION TO EUCLID'S GEOMETRY

1. State the Euclid's axiom for the following:

(i) If  $x = z$  and  $y = z$ , then  $x = y$

(ii)  $x = z/2$  and  $y = z/2$ , then  $x = y$

(iii) If  $x = y$  then on adding  $z$  on both sides, we get  $x + z = y + z$ .

(iv)  $x = 2z$  and  $y = 2z$ , then  $x = y$ .

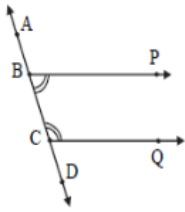
(v) Let  $y$  and  $z$  are parts of  $x$ , such that  $x = y + z$ , then  $x > y$  and  $x > z$ .

(vi) Let  $PQ$  and  $RS$  are two line segments which coincides with each other, then  $PQ = RS$ .

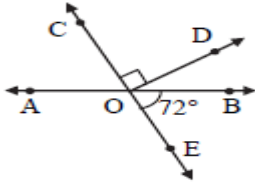
2. If  $x + y = 10$  and  $x = z$ , then show that  $z + y = 10$ , by using appropriate Euclids axiom.

### LINES AND ANGLES

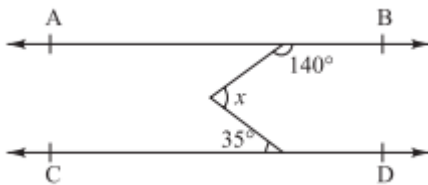
- The supplementary angles are in the ratio 4:5, find the angles.
- Find the measure of an angle, if seven times its complement is  $10^\circ$  less than three times its supplement.
- In the given figure, lines  $BP \parallel CQ$ , if  $\angle ABP = 105^\circ$ , find  $\angle DCQ$



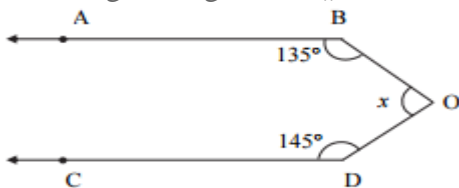
- In the given figure, find  $\angle BOC$ ?



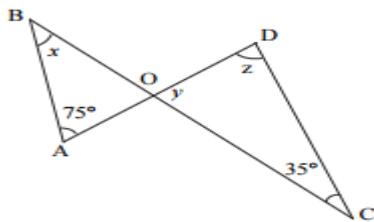
- In the given figure,  $AB \parallel CD$ , then find the value of  $x$



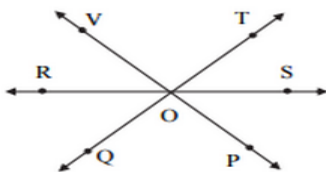
- In the given figure  $AB \parallel CD$ . Find the value of  $x$ ?



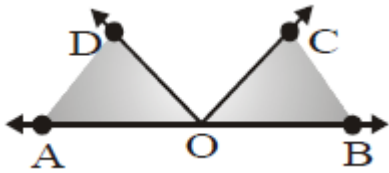
- In the given figure,  $AB \parallel CD$ , find the value  $y$ .



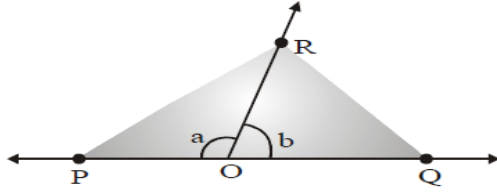
- In the given figure, lines  $RS$ ,  $VP$  and  $TQ$  intersect at point  $O$ ,  $\angle VOS = 100^\circ$ ,  $\angle ROT = 122^\circ$ . Find  $\angle ROQ$ ?



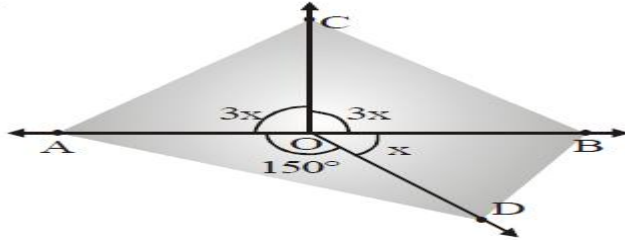
- In figure write all pairs of adjacent angles and all the linear pairs.



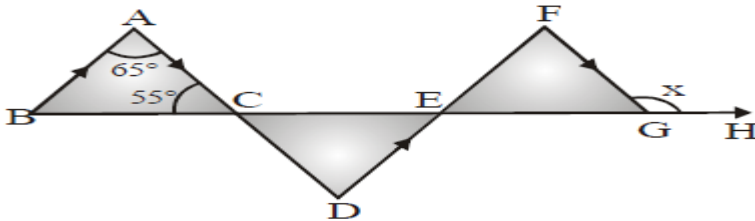
10.  $\angle POR$  and  $\angle QOR$  form a linear pair. If  $a - b = 80^\circ$ , find the values of  $a$  and  $b$ .



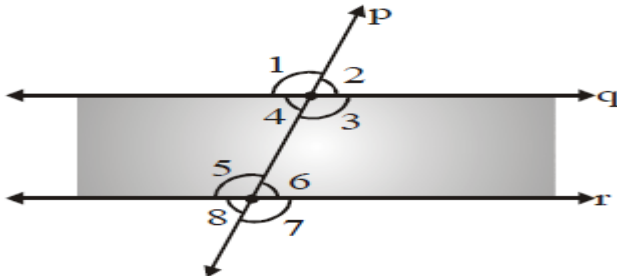
11. In figure, determine the value of  $x$ .



12. In figure if  $BA \parallel DF$ ,  $AD \parallel FG$ ,  $\angle BAC = 65^\circ$  and  $\angle ACB = 55^\circ$ , then Find  $\angle FGH$ .



13. In figure, if  $p$  is a transversal to lines  $q$  and  $r$ ,  $q \parallel r$  and  $\angle 1$  and  $\angle 2$  are in the ratio  $3 : 2$ , find all the angles.



## TRIANGLES

### FILL IN THE BLANKS:

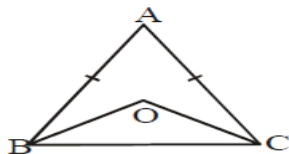
- Sides opposite to the equal angles of a triangle are\_\_\_\_\_.
- Angles opposite to the equal sides of a triangle are\_\_\_\_\_.
- In an isosceles triangle  $ABC$  with  $AB = AC$ , if  $BD$  and  $CE$  are its altitudes, then  $BD$ \_\_\_\_\_  $CE$ .
- If altitudes  $CE$  and  $BF$  of a triangle  $ABC$  are equal, then  $AB =$ \_\_\_\_\_.
- In right triangles  $PQR$  and  $DEF$ , if hypotenuse  $PQ =$  hypotenuse  $EF$  and

side  $PR=DE$ , then  $\Delta PQR \cong \Delta$ \_\_\_\_\_.

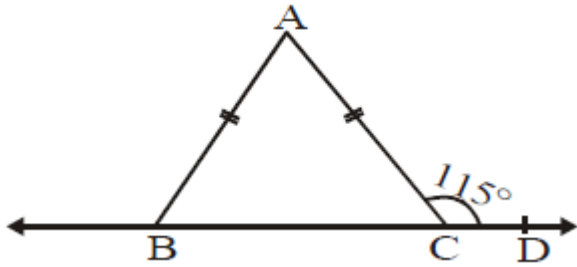
- (f) In a triangle ABC, if  $BC = AB$  and  $\angle C = 80^\circ$ , then  $\angle B =$ \_\_\_\_\_.
- (g) In a triangle PQR, if  $\angle P = \angle R$ , then  $PQ =$ \_\_\_\_\_.
- (h) If two sides and the\_\_\_\_\_angle of one triangle are respectively equal to two sides and the included angle of the other triangle, then the triangles are congruent.
- (i) If in two triangles ABC and PQR,  $AB = QR$ ,  $\angle A = \angle Q$  and  $\angle B = \angle R$ , then  $\Delta ABC \cong \Delta$ \_\_\_\_\_.
- (j) If in two triangles ABC and DEF,  $AB = DF$ ,  $BC = DE$  and  $\angle B = \angle D$ , then  $\Delta ABC \cong \Delta$ \_\_\_\_\_.
- (k) If in two triangles PQR and DEF,  $PR = EF$ ,  $QR = DE$  and  $PQ = FD$ , then  $\Delta PQR \cong \Delta$ \_\_\_\_\_.
- (l) Sum of any two sides of a triangle is \_\_\_\_\_ than the third side.
- (m) If two angles of a triangle are unequal, then the smaller angle has \_\_\_\_\_ side opposite to it.
- (n) Of all the line segments drawn from a point to a line not containing it, the\_\_\_\_\_ line segment is the shortest.
- (o) Difference of any two sides of a triangle is\_\_\_\_\_than the third side.
- (p) If any two sides of a triangle are unequal, then the larger side has the\_\_\_\_\_angle opposite to it.
- (q) The sum of the three altitudes of a triangle is\_\_\_\_\_than its perimeter.
- (r) In a right triangle, the hypotenuse is the\_\_\_\_\_side.
- (s) The perimeter of a triangle is\_\_\_\_\_than the sum of its medians.

#### VERY SHORT ANSWER TYPE QUESTIONS :

1. Which of the following pairs of triangles are congruent?
- (a)  $\Delta ABC$  and  $\Delta DEF$  in which :  $BC = EF$ ,  $AC = DF$  and  $\angle C = \angle F$ .
- (b)  $\Delta ABC$  and  $\Delta PQR$  in which :  $AB = PQ$ ,  $BC = QR$  and  $\angle C = \angle R$ .
- (c)  $\Delta ABC$  and  $\Delta LMN$  in which :  $\angle A = \angle L = 90^\circ$ ,  $AB = LM$ ,  $\angle C = 40^\circ$  and  $\angle M = 50^\circ$ .
- (d)  $\Delta ABC$  and  $\Delta DEF$  in which :  $\angle B = \angle E = 90^\circ$  and  $AC = DF$ .
2. In  $\Delta ABC$ ,  $AB = AC$ . OB and OC are bisectors of  $\angle B$  and  $\angle C$  respectively. Show that  $OB = OC$ .



3. In  $\Delta ABC$ , we have,  $\angle A > \angle B > \angle C$ , then determine the shortest and the longest side of the triangle.
4. If  $\Delta ABC \cong \Delta PQR$ ,  $\angle B = 40^\circ$  and  $\angle C = 95^\circ$ , find  $\angle P$ .
5. In  $\Delta ABC$ ,  $AB = BC = 5\text{cm}$  and  $\angle A = 55^\circ$ , find  $\angle B$ ..
6. In fig,  $AB = AC$  and  $\angle ACD = 115^\circ$ . Find  $\angle A$



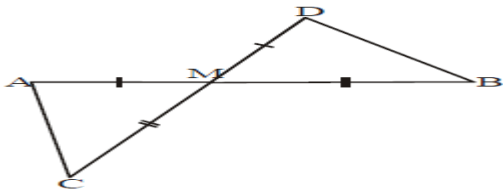
7. In  $\triangle ABC$ ,  $BC = AC$  and  $\angle B = 64^\circ$ , find  $\angle C$ .

8. In  $\triangle PQR$ ,  $\angle P = 50^\circ$  and  $\angle R = 70^\circ$ . Name :

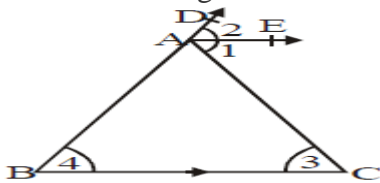
(i) the shortest side (ii) the longest side of the triangle.

**SHORT ANSWER TYPE QUESTIONS :**

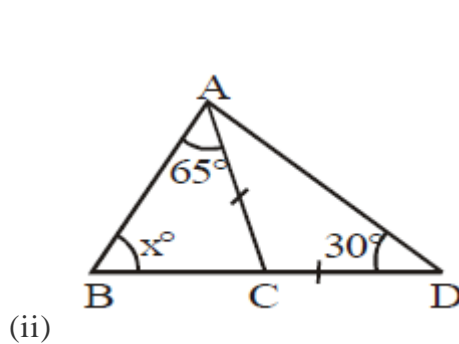
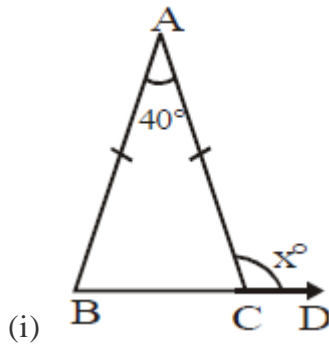
1. In the given fig, the line segments  $AB$  and  $CD$  intersect at a point  $M$  in such a way that  $AM = MD$  and  $CM = MB$ . Prove that,  $AC = BD$  but  $AC$  may not be parallel to  $BD$ .



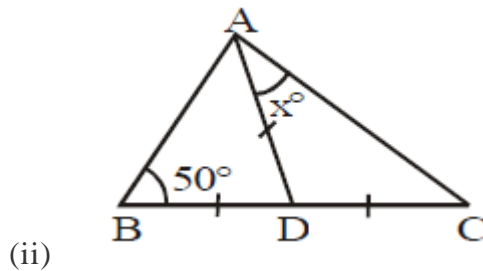
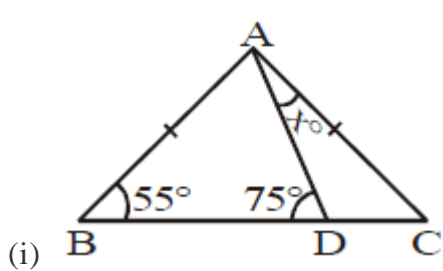
2. If the bisector of the exterior vertical angle of a triangle is parallel to the base, show that the triangle is isosceles.



3. In each of the following figures, find the value of  $x$ :



4. In each of the following figures, find the value of  $x$ :



## QUADRILATERALS

1. In a parallelogram, show that the angle bisectors of two adjacent angles intersect at right angles.
2. If an angle of a parallelogram is two-thirds of its adjacent angle, find the angles of the parallelogram.
3. In a quadrilateral ABCD, CO and DO are the bisectors of  $\angle C$  and  $\angle D$  respectively. Prove that 
$$\angle COD = \frac{1}{2}(\angle A + \angle B).$$
4. D, E and F are the mid points of the sides BC, CA and AB respectively of an equilateral triangle ABC. Show that triangle DEF is also an equilateral triangle.
5. In  $\triangle ABC$ , D, E and F are the mid points of the sides BC, CA and AB respectively. If  $AB = AC = 7.2$  cm and  $BC = 6$  cm, find the sides of  $\triangle DEF$ .
6. ABCD is a trapezium in which AB is parallel to DC and P is the mid point of AD. A line segment PQ is parallel to AB meets BC at Q. Show that Q is the mid point of BC.

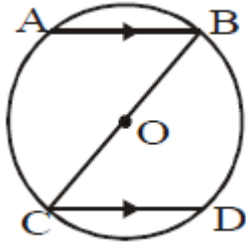
## AREAS OF PARALLELOGRAMS AND TRIANGLES

1. In a quadrilateral ABCD, P is the midpoint of AC. Prove that  $\text{ar}(\triangle ABP) = \text{ar}(\triangle BCP)$ .
2. BD is one of the diagonals of quadrilateral ABCD. If  $AL \perp BD$  and  $CM \perp BD$ , show that  $\text{area of quad ABCD} = \frac{1}{2} \times BD \times (AL + CM)$ .
3. A point E is taken on the side BC of a parallelogram ABCD. AE and DC are produced to meet at F. Prove that  $\text{ar}(\triangle ADF) = \text{ar}(\triangle ABFC)$ .
4. ABCD is a parallelogram and M is any point on DC. Prove that  $\text{ar}(\triangle ADM) + \text{ar}(\triangle BCM) = \text{ar}(\triangle ABM)$ .
5. If the mid points of the sides of a quadrilateral are joined in order, prove that the area of the parallelogram so formed will be half of the area of the given quadrilateral.
6. In a  $\triangle ABC$ ,  $AB = 8$  cm and altitude corresponding to AB = 5 cm. In  $\triangle DEF$ ,  $EF = 10$  cm. Determine the altitude corresponding to side EF if  $\text{ar}(\triangle ABC) = \text{ar}(\triangle DEF)$ .

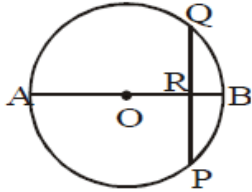
## CIRCLES

1. The radii of two concentric circles are 17 cm and 10 cm. A line segment PQRS cuts the larger circle at P and S and the smaller circle at Q and R. If  $QR = 12$  cm, find the length PQ.
2. Two circles of radii 17 cm and 25 cm intersect each other at two points A and B. If the length of common chord AB of the circles be 30 cm, find the distance between the centres of the circles.
3. In the adjoining figure, BC is a diameter of a circle with centre O. If AB and CD are two chords such that  $AB \parallel CD$ , prove that  $AB = CD$ .

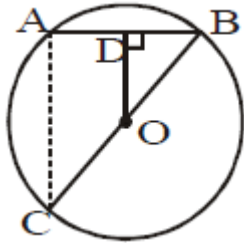




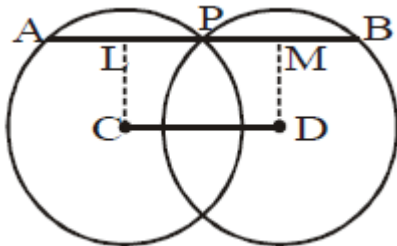
4. The adjoining figure shows a circle with centre O in which a diameter AB bisects the chord PQ at point R. If  $PR = RQ = 8$  cm and  $RB = 4$  cm, find the radius of the circle.



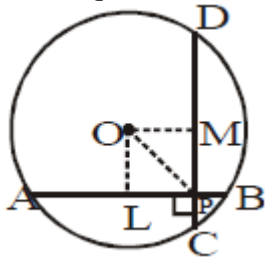
5. In the adjoining figure, AB is a chord of a circle with centre O and BC is a diameter. If  $OD \perp AB$ , show that  $CA = 2 OD$  and  $CA \parallel OD$ .



6. In the adjoining figure, P is a point of intersection of two circles with centres C and D. If the straight line APB is parallel to CD, prove that  $AB = 2 CD$ .

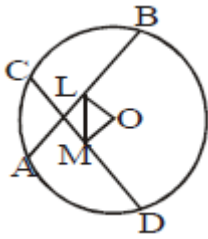


7. In the given figure, equal chords AB and CD of a circle with centre O, cut at right angles at P. If L and M are mid-points of AB and CD respectively, prove that OLPM is a square.

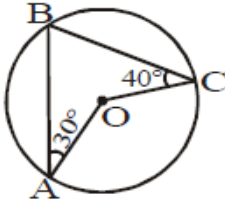


8. In the given figure, L and M are mid-points of two equal chords AB and CD of a circle with centre O. Prove that:

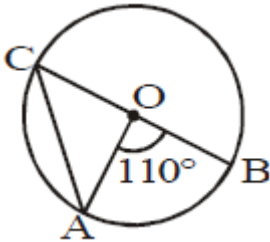
(i)  $\angle OLM = \angle OML$  (ii)  $\angle ALM = \angle CML$



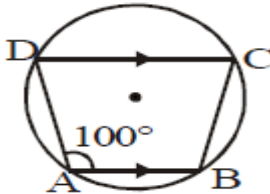
9. In the given figure, O is the centre of the circle;  $\angle OAB = 30^\circ$  and  $\angle OCB = 40^\circ$ . Calculate  $\angle AOC$ .



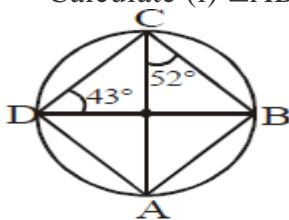
10. In the given figure, O is the centre of the circle and  $\angle AOB = 110^\circ$ . Calculate  
(i)  $\angle ACO$  (ii)  $\angle CAO$ .



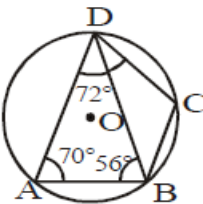
11. In the given figure,  $AB \parallel DC$  and  $\angle BAD = 100^\circ$ . Calculate :  
(i)  $\angle BCD$  (ii)  $\angle ADC$  (iii)  $\angle ABC$ .



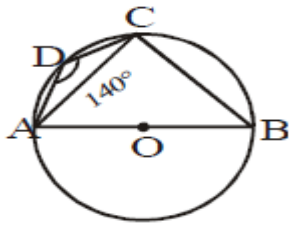
12. In the given figure,  $\angle ACB = 52^\circ$  and  $\angle BDC = 43^\circ$ . Calculate (i)  $\angle ADB$  (ii)  $\angle BAC$  (iii)  $\angle ABC$ .



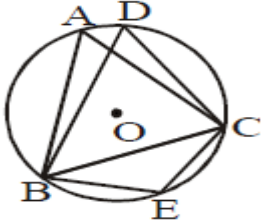
13. In the given figure,  $\angle BAD = 70^\circ$ ,  $\angle ABD = 56^\circ$  and  $\angle ADC = 72^\circ$ . Calculate  
(i)  $\angle BDC$  (ii)  $\angle BCD$



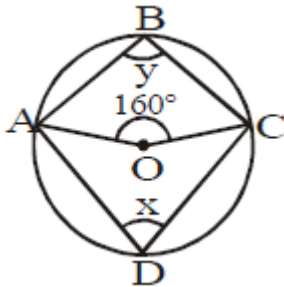
14. In the given figure, O is the centre of the circle. If  $\angle ADC = 140^\circ$ , find  $\angle BAC$ .



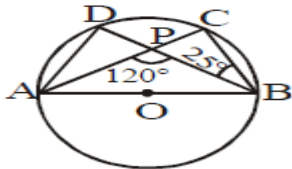
15. In the given figure, O is the centre of the circle and  $\Delta ABC$  is equilateral. Find (i)  $\angle BDC$  (ii)  $\angle BEC$ .



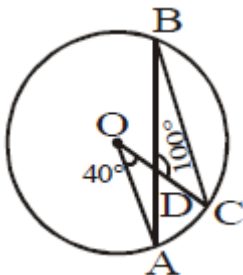
16. In the given figure, O is the centre of the circle and  $\angle AOC = 160^\circ$ .  
Prove that  $3\angle y - 2\angle x = 140^\circ$ .



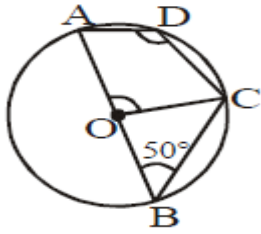
17. In the given figure, O is the centre of the circle. If  $\angle CBD = 25^\circ$  and  $\angle APB = 120^\circ$ , find  $\angle ADB$ .



18. In the given figure, O is the centre of the circle;  $\angle AOD = 40^\circ$  and  $\angle BDC = 100^\circ$ .  
Find  $\angle OCB$ .

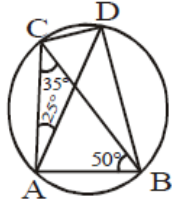


19. In the given figure, O is the centre of the circle and  $\angle OBC = 50^\circ$ . Calculate  
(i)  $\angle ADC$  (ii)  $\angle AOC$ .



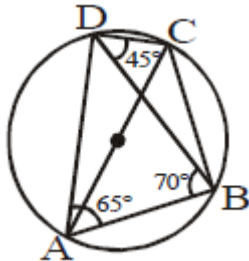
20. In the given figure, ABDC is a cyclic quadrilateral in which  $\angle CAD = 25^\circ$ ,  $\angle ABC = 50^\circ$  and  $\angle ACB = 35^\circ$ .

Calculate: (i)  $\angle CBD$  (ii)  $\angle DAB$  (iii)  $\angle ADB$

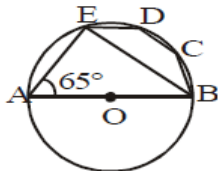


21. In the adjoining figure,  $\angle BAD = 65^\circ$ ,  $\angle ABD = 70^\circ$  and  $\angle BDC = 45^\circ$ . Find:

(i)  $\angle BCD$  (ii)  $\angle ADB$  Hence, show that AC is a diameter.



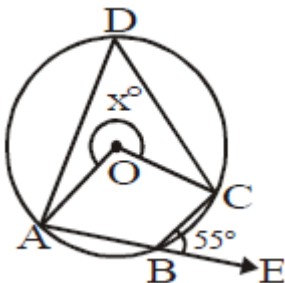
22. In the given figure, AB is a diameter of a circle with centre O and chord ED is parallel to AB and  $\angle EAB = 65^\circ$ . Calculate (i)  $\angle EBA$  (ii)  $\angle BED$  (iii)  $\angle BCD$



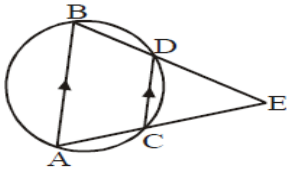
23. In the given figure, O is the centre of a circle and ABE is a straight line.

If  $\angle CBE = 55^\circ$ , find :

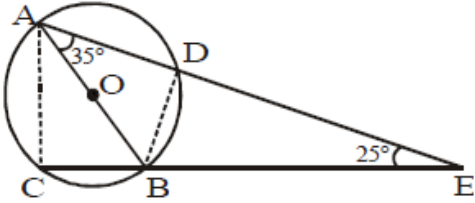
(i)  $\angle ADC$  (ii)  $\angle ABC$  (iii) the value of x.



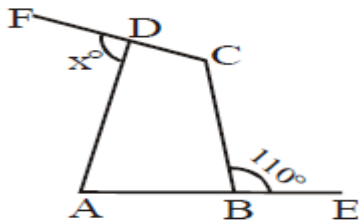
24. In the given figure AB and CD are two parallel chords of a circle. If BDE and ACE are straight lines, intersecting at E, prove that  $\triangle AEB$  is isosceles.



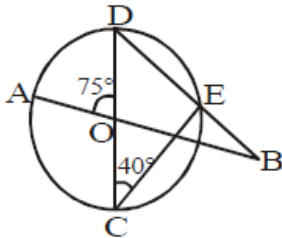
25. In the given figure, AB is a diameter of a circle with centre O. If ADE and CBE are straight lines, meeting at E such that  $\angle BAD = 35^\circ$  and  $\angle BED = 25^\circ$ , find : (i)  $\angle DCB$  (ii)  $\angle DBC$ . (iii)  $\angle BDC$



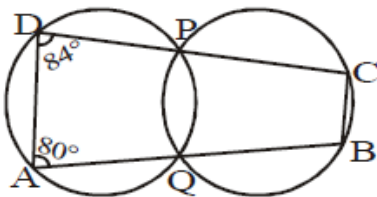
26. In the given figure, find whether the points A, B, C, D are concyclic, when  
(i)  $x = 70$  (ii)  $x = 80$ .



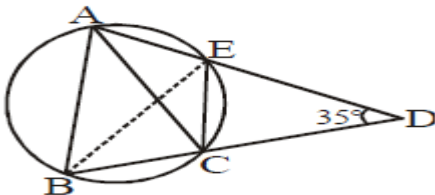
27. In the given figure, the straight lines AB and CD pass through the centre O of the circle. If  $\angle AOD = 75^\circ$  and  $\angle OCE = 40^\circ$ , find : (i)  $\angle CDE$  (ii)  $\angle OBE$ .



28. In the given figure, the two circles intersect at P and Q. If  $\angle A = 80^\circ$  and  $\angle D = 84^\circ$ , calculate  
(i)  $\angle QBC$  (ii)  $\angle BCP$



29. In the adjoining figure,  $AB = AC = CD$ ,  $\angle ADC = 35^\circ$ . Calculate :  
(i)  $\angle ABC$  (ii)  $\angle BEC$



## CONSTRUCTIONS

1. Construct the angles of  $105^\circ$  and  $22 \frac{1}{2}^\circ$  and verify by measuring them by a protractor.

2. Construct a  $\Delta ABC$  with base  $BC = 4.5\text{cm}$ ,  $\angle B = 60^\circ$  and  $AB + AC = 7\text{cm}$ .
3. Construct a  $\Delta ABC$  in which  $BC = 7.5\text{cm}$ ,  $\angle B = 30^\circ$  and  $AC - AB = 2.5\text{cm}$
4. Construct a triangle with perimeter  $7.5\text{cm}$  and base angles  $60^\circ$  and  $45^\circ$
5. Construct a right angled triangle whose perimeter is equal to  $10\text{cm}$  and one acute angle is of  $30^\circ$
6. Construct a  $\Delta ABC$  in which  $BC = 3.4\text{cm}$ ,  $\angle B = 45^\circ$  and  $AB - AC = 1.5\text{cm}$

### **HERON'S FORMULA**

- Q1. Find the area of a triangle whose perimeter is  $180\text{cm}$  and two of its sides are  $80\text{cm}$  and  $18\text{cm}$ .  
Hence calculate the altitude of the triangle taking longest side as base.
- Q2. The sides of a triangle are  $39\text{cm}$ ,  $42\text{cm}$  and  $45\text{cm}$ . A parallelogram stands on the greatest side of the triangle and has the same area as that of a triangle. Find the height of a parallelogram.
- Q3. Find the cost of leveling a ground in the form of a triangle having its sides as  $40\text{m}$ ,  $70\text{m}$  and  $90\text{m}$  at rupees  $8$  per sq.m. (use  $\sqrt{5} = 2.24$ )
- Q4 Find the height of an equilateral triangle whose perimeter is  $66\text{cm}$ . Calculate its area.
- Q5. The perimeter of a rhombus  $ABCD$  is  $40\text{cm}$ . Find the area of the rhombus if its diagonal  $BD$  measure  $12\text{cm}$ .
- Q6. The sides of a triangle are  $x$ ,  $x+1$ ,  $2x-1$  and its area is  $x\sqrt{10}$ . What is the value of  $x$ ?
- Q7. Two parallel sides of a trapezium are  $60\text{cm}$  and  $77\text{cm}$  and other sides are  $25\text{cm}$  and  $26\text{cm}$ . Find the area of the trapezium. (ans :  $1644\text{ cm}^2$ )
- Q8. Find the length of each side of an equilateral triangle whose area is  $4\sqrt{3}\text{ cm}^2$ . Find its perimeter and height.

### **SURFACE AREAS AND VOLUMES**

1. How many cubic metres of earth must be dug out to sink a well  $22.5\text{ m}$  deep and of diameter  $7\text{m}$ ? Also, find the cost of plastering the inner curved surface at rupees  $3$  per square metre.
2. A pit is in the form of a cube of edge  $120\text{cm}$ . If its surface i.e. bottom and four walls are to be covered with tiles each of size  $10\text{cm} \times 10\text{cm}$  then find the number of tiles required. Also find the labouring cost of putting tiles at the rate of rupees  $150$  per square metre. Ans (720, 1080)
3. Three equal cubes are placed adjacent to each other in a row. Find the ratio of total surface area of the new cuboid to that of the sum of the surface areas of the three cubes. Ans (7:9)
4. A hollow cylindrical copper pipe is  $210\text{cm}$  long. Its outer and inner diameters are  $10\text{cm}$  and  $6\text{cm}$  respectively. Find the volume of the copper used in making the pipe. Ans ( $10560\text{ cm}^3$ )
5. The sum of length, breadth and depth of a cuboid is  $19\text{cm}$  and the length of its diagonal is  $11\text{cm}$ . Find the surface area of the cuboid. (ans :  $240\text{cm}^2$ )
6. How many metres of cloth  $5\text{m}$  wide will be required to make a conical tent, the radius of whose base is  $7\text{m}$  and whose height is  $24\text{m}$ ? (Ans:  $110\text{m}$ )
7. The height of a cylinder is  $15\text{cm}$  and its curved surface area is  $660\text{ sq.cm}$ . Find its radius.

8. The height and radius of a cone are in ratio 21 : 7. The area of base is 154 sq.cm. Find the lateral surface area of the cone.
9. Volume of a sphere is 4851 cu.cm. Find its surface area.
10. The capacity of closed cylindrical vessel of height 2m is 25120 litres. How many sq.m.of metal sheet would be needed to make it? (Use  $\pi = 3.14$ )
11. The surface area of a solid sphere is 5544 cm<sup>2</sup>. It is cut into two hemispheres. Calculate the radius of the sphere and the total surface area of each hemisphere. Ans ( radius = 21 cm and TSA= 4148 cm<sup>2</sup>)
12. The length of a room is one and a half times its breadth. The cost of carpeting the room at rupees 3.25 per m<sup>2</sup> is rupees 175.50 and the cost of papering the walls at rupees 1.40 per m<sup>2</sup> is rupees 240.80. If 1door and 2 windows occupy 8m<sup>2</sup>, find the dimensions of the room. (Ans : L= 9m , B=6m and H= 6m)

### **STATISTICS**

1. Following is the data of the ages of 30 students of class IX in a school .Prepare a frequency distribution table.

15 , 15 , 16 , 16 , 14 , 17 , 17 , 16 , 15 , 15 , 16 , 16 , 17 , 15 , 16 , 16 , 14 , 16 , 15 , 14 , 16 , 16 , 16 , 17 , 16 , 15 , 15 , 14 , 15 , 16

2. If the class marks of a frequency distribution are:  
12.5 , 17.5 , 22.5 , 27.5 , 32.5 , 37.5 , 42.5 , 47.5 . Find the class size and class limits.

3. Make a histogram with the help of following data:

<b>Marks</b>	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
<b>Frequency</b>	4	10	16	22	20	18	8	2

4. Marks of two groups of students of a class are given below:

<b>Marks</b>	<b>Number of students</b>	
	<b>Group A</b>	<b>Group B</b>
55-60	5	2
50-55	6	15
45-50	12	8
40-45	15	6
35-40	17	7
30-35	14	5
25-30	10	14

20-25	11	4
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Construct a frequency polygon for each of these groups on the same axes.

5. If the mean of the following data is 5, find p.

<b>x</b>	2	3	5	p	9
<b>f</b>	9	4	6	3	8

6. Arun scored 36 marks in English, 44 marks in Hindi , 75 marks in Maths and x marks in Science. If he has secured an average of 50 marks, find the value of x.

7. Find the median for the following:

2000 , 1180 , 1785 , 1500 , 560 , 782 , 1200 , 385 , 1123 , 222

8. The median of the following observations arranged in descending order is 25. Find x. Also find the unknown values.

50, 42, 35,  $2x + 10$ ,  $2x - 8$ , 12, 11, 8

9. Find out mode from the following data. In the given data if 15 is replaced by 24, what is the change in mode?

7 , 4 , 10 , 9 , 15 , 11 , 7 , 9 , 9

10. The mean monthly salary of 10 members of a group is rupees 1445, one more member whose monthly salary is rupees 1500 has joined the group. Find the mean monthly salary of 11 members of the group.

### **PROBABILITY**

1. A recent survey found that the ages of workers in a factory are distributed as follows:

Age (in years)	20-29	30-39	40-49	50-59	60 and above
No. of workers	38	27	86	46	3

If a person is selected at random , find the probability that the person is

- (i) 40 years or more
- (ii) Under 40 years
- (iii) Having age from 30 – 39 years
- (iv) Under 60 but over 39 years

2. If  $\frac{3}{11}$  is the probability that an event will happen, what is the probability that it will not happen?

3. A letter of English alphabet is chosen at random. Find the probability that the letter so chosen is a consonant.

4. Weights (in kg) of 40 students of class IX were recorded as follows:

Weights (in Kg)	40-50	50-60	60-70	70-80
No. of students	9	12	10	9

Find the probability of a student of this class, selected at random, having weight 50kg or more.



5. 40 good eggs are accidentally mixed with 10 bad ones. When each of these 50 eggs is checked, find the probability that a particular egg is found to be good.
6. Two coins are tossed simultaneously. Find the probability of getting one or more tail.
7. From a well shuffled pack of 52 cards, a card is drawn at random. Find the probability that it is :
- (i) a spade      (ii) a black      (iii) a queen      (iv) an ace of diamond
8. A bag contains 20 balls out of which 'x' are black. 10 more black balls are put in the box. If the probability of drawing a black ball is double of what it was before, find x.
9. In a survey of 350 women, 132 were found to be working. If a woman is selected at random, then find the probability that she is not working.
10. On a page of a telephone directory ,there were 200 numbers. The frequency distribution of their unit place digit is given in the following table;

DIGIT	0	1	2	3	4	5	6	7	8	9
FREQUENCY	22	26	22	22	20	10	14	28	16	20

Find the probability of a number chosen at random , having unit place digit as

- (i) 6      (ii) a prime number.