MATHS

BOOKS - TARGET MATHS (HINGLISH)

CHALLENGING QUESTIONS

Similarity

1. In ABCD side BC || side AD. Seg AC and seg BD intersect in point Q. If AQ=1/3 AC then show that $DQ = \frac{1}{2}BQ$

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2. The bisector of interior $\angle A of \triangle ABC$ meets BC in D, and the bisector of exterior angle $\angle A$meets BC produced in E. prove that $\frac{BD}{BE} = \frac{CD}{CE}$

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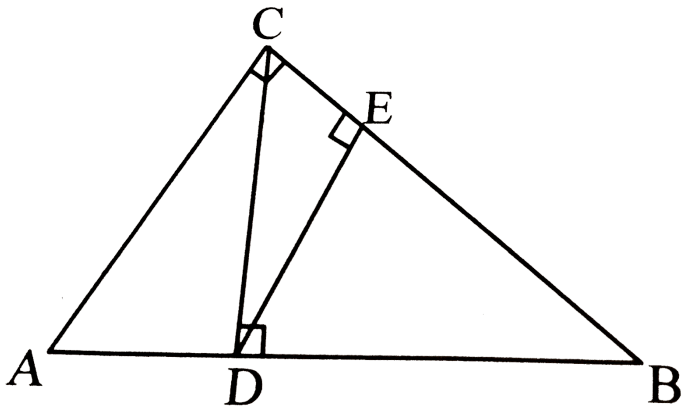
3. In $\Delta ABC, \angle ACB = 90^\circ$

seg CD $\perp$ seg AB

seg DE $\perp$ seg CB.

Show that: $CD^2 \times AC = AD \times AB \times DE$



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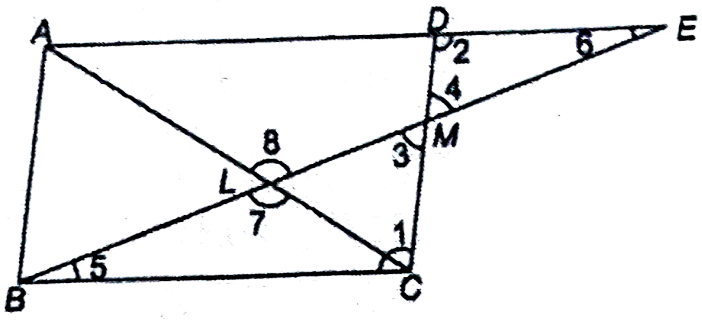
4. Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn,

intersecting AC in L and AD produced in El.

Prove that EL= 2BL



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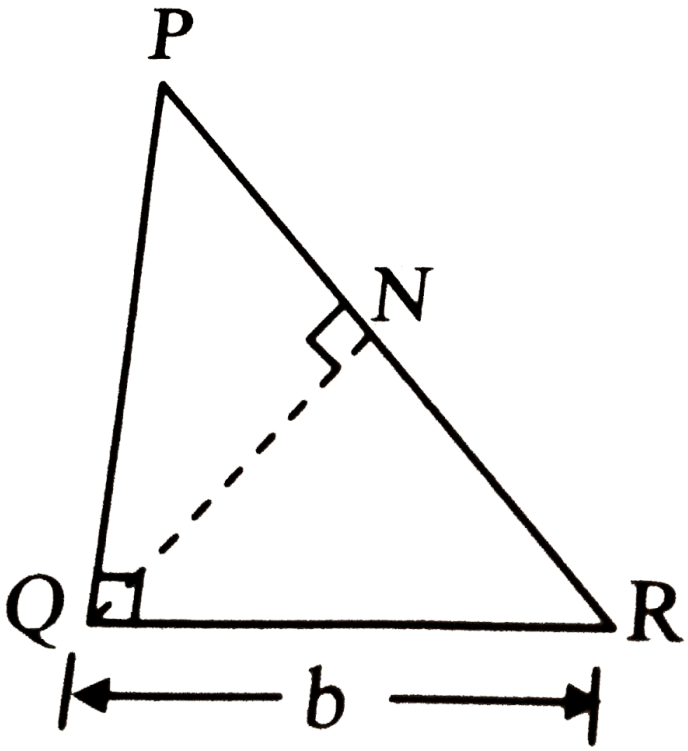
Pythagoras Theorem

1. ΔPQR is a right angled triangle, right angled at Q such that QR = b and $A(\Delta PQR)$ =

a if QN $\perp$ PR then show that

$$QN = \frac{2a.\,b}{\sqrt{b^4 + 4a^2}}$$



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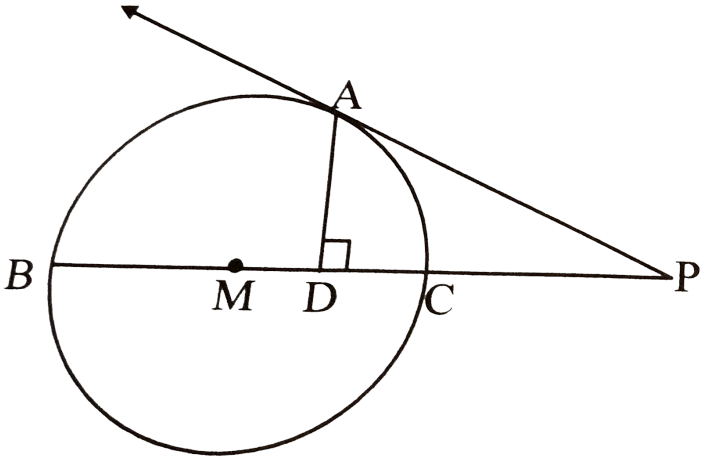
Circle

1. In the adjoining figure, BC is a diameter of the circle with centre M. PA is a tangent at A from P, which is a point on line BC. AD $\perp$ BC prove that $DP^2 = BP \times CP - BD \times CD$



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2. Find the length of the longest chord of the circle of radius 5.2 cm.

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3. Radius of a circle with centre O is 4 cm. if /(OP) = 4.2 cm then state where point P will lie with respect to the circle.

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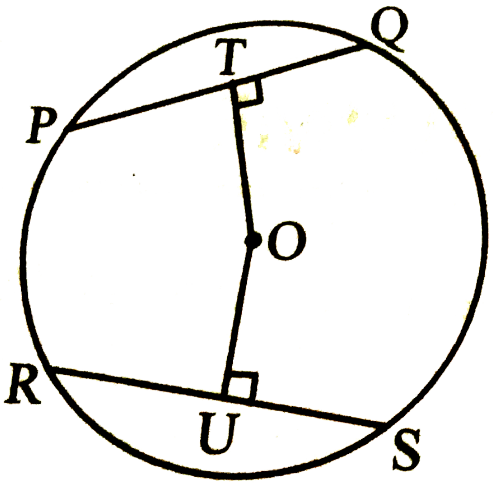
4. In the given figure, O is the center and chord PQ = Chord RS. If OT = 5 cm, then find OU.



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5. If the circumcentre of a triangle lies outside the triangle, then what type of triangle is it ?

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6. The circumcentre of which triangle lies on any one of the sides of the triangle ?

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7. If the circumcentre and the incentre of a triangle coincide, then what can you say about the triangle ?

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8. The radius of a circle is 5 cm and the distance of a chord from the centre is 3 cm . Find the length of the chord.

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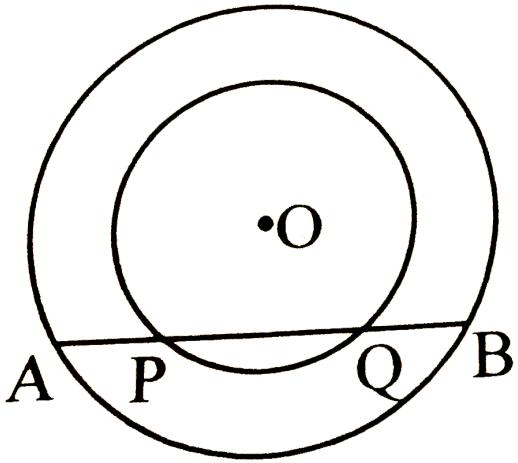
9. In the given figure, centre of two circles is O. Chord AB of bigger circle intersects the smaller circle in points P and Q . Show that AP = BQ.



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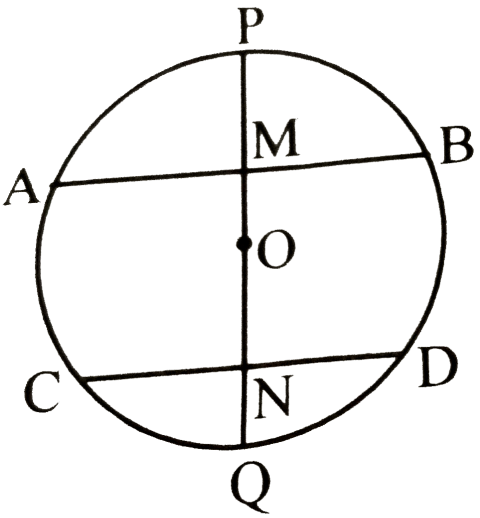
10. Prove that, if a diameter of a circle bisects two chords of the circle then those two chords are parallel to each other.



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Geometric Constructions

1. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

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2. Draw a triangle ABC with side BC = 7 cm, $\angle B = 45^\circ, \angle A = 105^\circ$. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle$ ABC.

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Co Ordinate Geometry

1. Points $A(-1, y)$ and B (5, 7) lieon a circle with centre O (2, - 3) . Find the values of y . Hence find the radius of the circle.

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2. Prove that the points (3, 0), (6, 4) and (-1, 3) are the vertices of a right angled isosceles triangle.

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3. If the centre of a circle is (2a,a-7) ,then Find the value of a , if the ciecle passes through the point (11,-9) and has diameter $10\sqrt{2}$ units .

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4. Write the quadrant or on which axis the following points lie.

i. $A(-6, 2)$

ii. $B(0, -5)$

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5. If P(-1,1), Q(3,-4), R(1,-1), S(-2,-3) and T(-4,4)are plotted on the graph paper, then the point(s) in the fourth quadrant is/are

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6. If the x and y co-ordinates of a point are equal, then what can you say about the position of the point.

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7. The graphs of which of the equations given below will be parallel of the X-axis ?

i. $x = 3$

ii. $y - 2 = 0$

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8. Write the equation of line parallel to Y-axis and at a distance of 5 units to its left.

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9. The point A $(-5, -4)$ lies on a line parallel to X-axis . Write its equation.

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10. Write the equation of x axis.

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11. Y- axis and line x =-4 are paraller lines . What is the distance between them ?

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12. If 'b' is a real number, then what is the distance between lines y = b and y = - b ?

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13. How many lines are there which are paraller to the x-axis and having a distance 5 units ? Write their equatons.

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Trigonometry

1. Prove that $(1+\tan\theta)^2+(1+\cot\theta)^2=(\sec\theta+\text{cosec}\ \theta)^2$.

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2. If $\sec\theta-\tan\theta=P$ then obtain the values of $\tan\theta$ $\sec\theta$ and $\sin\theta$ in terms of P.

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3. Prove that

$$\frac{1+\sin x-\cos x}{1+\sin x+\cos x}+\frac{1+\sin x+\cos x}{1+\sin x-\cos x}$$

=2 cosec x

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4. The angle of elevation of a jet plane from a point A on the ground is $60o$. After a flight of 30 seconds, the angle of elevation changes to $30o$. If the jet plane is flying at a constant

height of $3600\sqrt{3}m$, find the speed of the jet plane.

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5. A pilot in an aeroplane observes that Vashi bridge is one side of the plane and Worli sea - link is just on the oposite side . The angles of depressons of Vashi bridge and Wrli sea - link are 60° and 30° respectively . If the aeroplane is at a height of $5500\sqrt{3m}$ at that

time , what is the distance between Vashi bridge and Wrli sea - link ?

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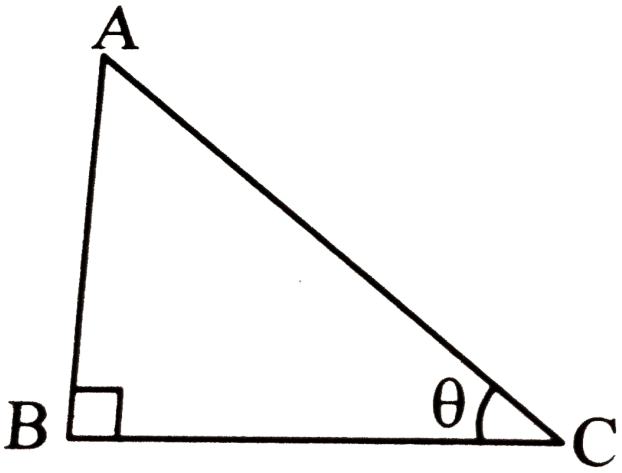
6. If in $\Delta ABC, \angle B = 90^\circ$ and $\angle C = \theta$, then write the ratios $\sin\theta$ and $\tan\theta$



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7. Find the Values of $\frac{\sin 36^\circ}{\cos 54^\circ}$.

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8. Fill in the blanks : $\tan 30^\circ \times \tan\_\_\_\_\_ = 1$

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9. If $\sin\theta = \frac{5}{13}$, then find $\cos\theta$

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10. Find the value of $\sin^2 30^\circ + \cos^2 60^\circ + \tan 45^\circ$.

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11. Find the value of $\frac{\tan 60^\circ}{\sin 30^\circ + \cos 60^\circ}$

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Mesuration

1. A cylindrical tub of radius 5 cm and length 9.8 cm is full of water. A solid in the form of right circular cone mounted on a hemisphere is immersed into the tub. The radius of the hemisphere is 3.5 cm and height of cone outside the hemisphere is 5 cm. Find the volume of water left in the tub.

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

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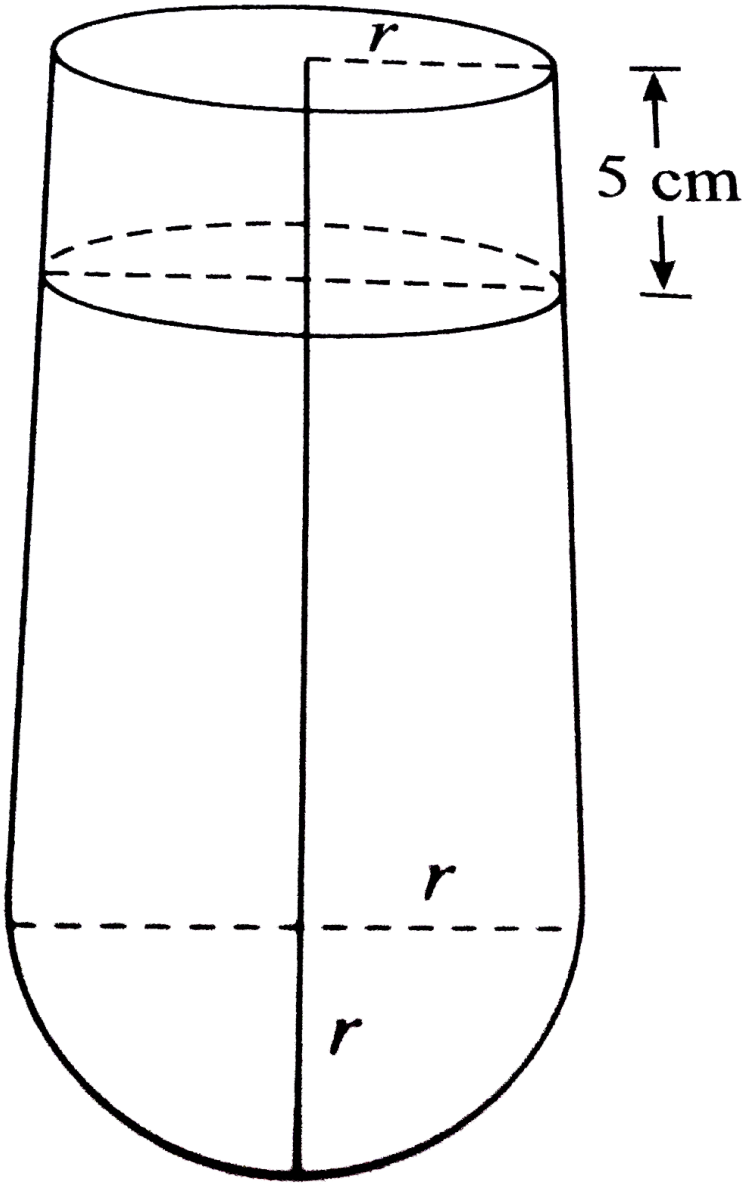
2. A test tube has lower part hemispherical and upper part cylindrical with the same radius. If $\frac{5159}{6} cm^3$ of water is poured, the test tube will be completely filled . But if $\frac{2002}{3} cm^3$ of water is poured , 5 cm of height will remain empty .Calculate the radius of the

tube and the height of the cylindrical part.



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3. A cylindrical jar of radius 10 cm is filled with water upto a height of 15cm. 14 sphercal balls of radius 3 cm each are immersed in the jar. Find the new level to which water is filled in the jar.

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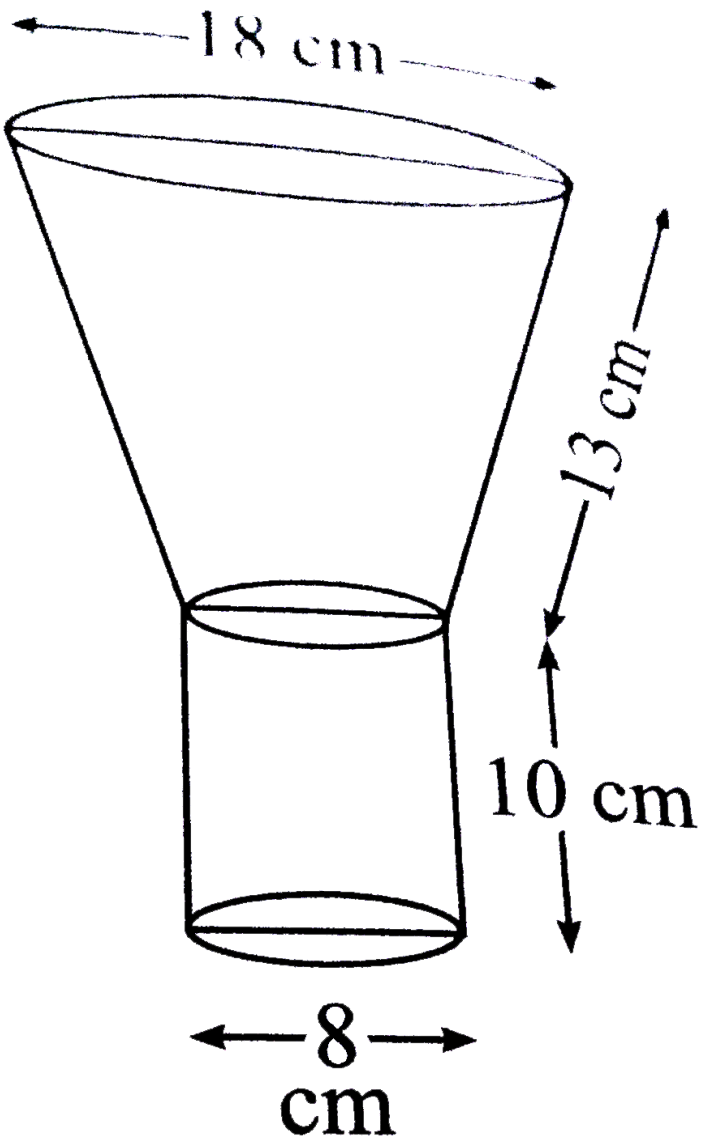
4. An oil funnel of tin sheet consists of a cylindrical portion 10 cm long attached to a

frustum of cone. The diameters of the top and bottom of the frustum are 18 cm and 8 cm respecti8vely. If the slant height of the frustum of the cone is 13 cm, find the area of the tin required to make the funnel from the given information in the figure

$(\pi = 3.14)$



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Basic Concepts In Geometry

1. If the co-ordinates of points A andB are (-5,0) and (2,0) respectively, then find d (A,B)

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2. Which figure is formed by three non-collinear points ?

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3. point C is the midpoint of seg AB. If AC = 5.5, then find the length of AB.

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4. If AB = 5 cm, BP = 2 cm and AP = 3.4 cm, then compare the segments.

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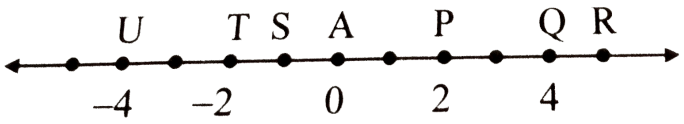
5. Answer the following question with the help of the figure given below .

Write the pairs of points equidistant from P.



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6. Write the following statement in if -then form . Diangonals of a rhombus bisect each other.

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7. Write the converse of the following statement. The alternate angles formed by two parallel lines and their transversal are congruent.

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8. Write the converse of 'if' the number is a prime, then it is even or odd' . Also state if the converse is true or not.

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9. From the information given below,find which of the point is between the other two. If the points are not collinear, stateso.

d(P, Q) = 10, d (Q, R) = 3, d (P,R) = 7.

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10. Points X, Y and Z are collinear such that d (X,Y) = 17, d (Y, Z) = 8, find d (X, Z).

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11. The co-ordinate o point b on the numberline is -3 . Find the co-ordinates of the points which are at adistance of 6 units from B.

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12. The following table shows points on a numberline and their co-ordinates. Decide whether the pair of segments given below the

table are congruent or not.

Point	L	M	N	P	Q	R
Co-ordinate	-5	0	8	-1	7	4

seg QR and seg LM.

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13. Answer the following question with the help of figure given below .

(i) Write the intersection of ray DB and ray AD.

(ii) Write the union set of ray AC and ray BE.

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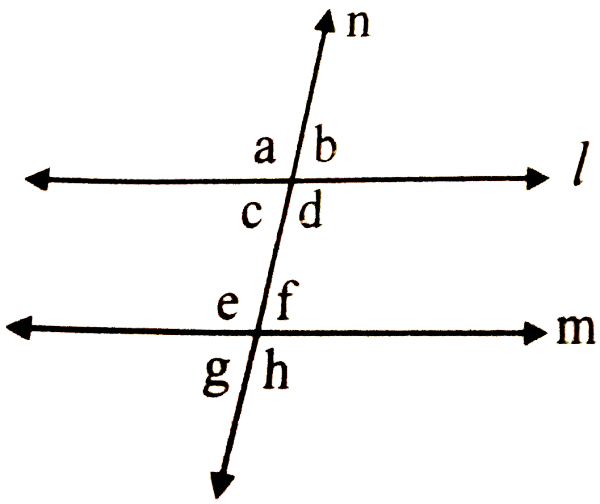
Paralles Lines

1. As shown in the figure, if lines /and m are parallel, then write algebraic equations using the property of interior angles.



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2. In the adjoining figure, identify (i) the pairs of corresponding angles. (ii) the pairs of alternate interior angles. (iii) the pairs of interior angles on the same side of the transversal. (iv) the vertically opposite angles.

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3. ALTERNATE EXTERIOR ANGLES A pair of angles in which one arm of each of the angles

is on opposite sides of the transversal and whose other arms are directed in opposite direction and do not include segment PQ is called a pair of alternate exterior angles.

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4. If two lines are parallel, then what can you say about the pairs of corresponding angles formed by their transversal ?

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5. In ΔABC , if $\angle A = 62^\circ, \angle B = 28^\circ$ then find $\angle C$

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6. In the given figure line $P \mid \mid Q$ and line / and line m are transversals. Measures of some angles are shown. Hence find the measures of $\angle a$ and $\angle c$.

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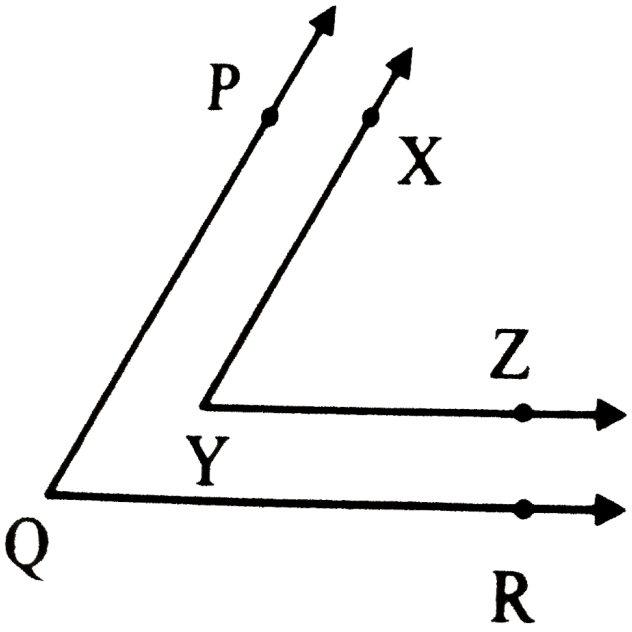
7. In the given figure sides of $\angle PQR$ and $\angle XYZ$ are parallel to each other. Prove that, $\angle PQR \cong \angle XYZ$.



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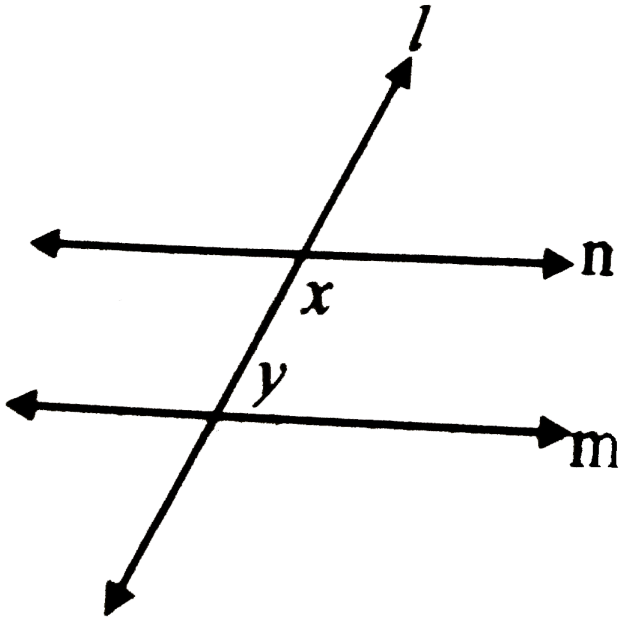
8. In the given figure, if $x = 125^\circ$ and $y = 54^\circ$ then are lines m and n parallel ? Justify.



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9. In the given figure , if $\angle a \cong \angle b$ and $\angle x \cong \angle y$, then prove that line l $||$ line n.

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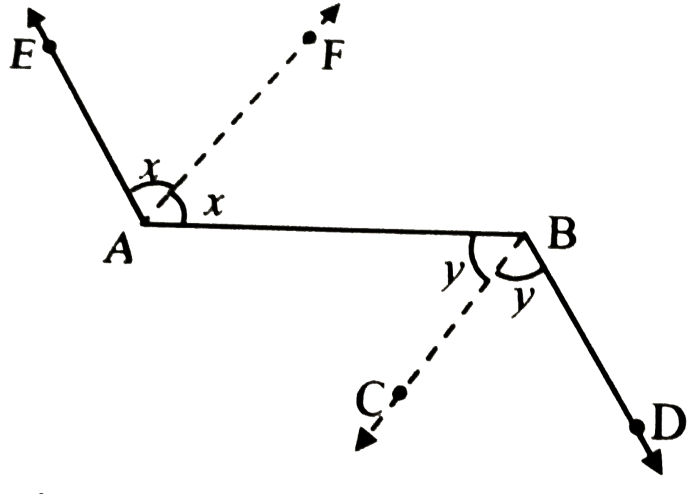
10. In the given figure, ray AE $||$ ray BD, ray AF is the bisector of $\angle EAB$ and ray BC is the bisector of $\angle ABD$. Prove that lineAF $||$ line

BC.



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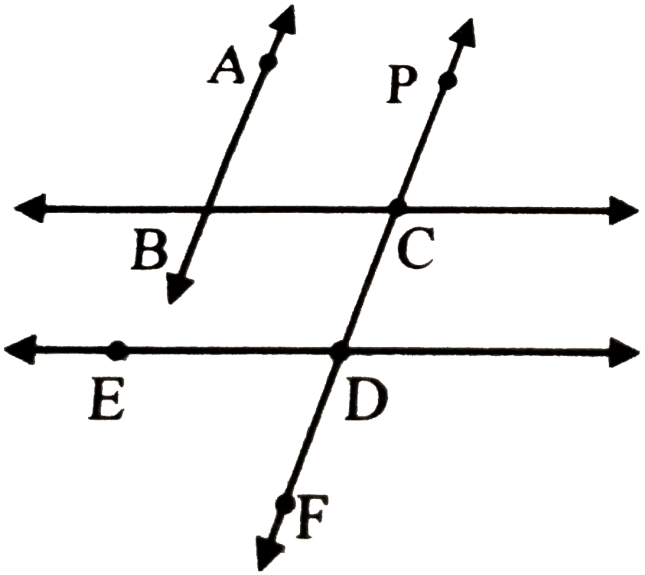
11. In the given figure, if line AB || line CF and line BC || line ED, then prove that

$\angle ABC = \angle FDE$.



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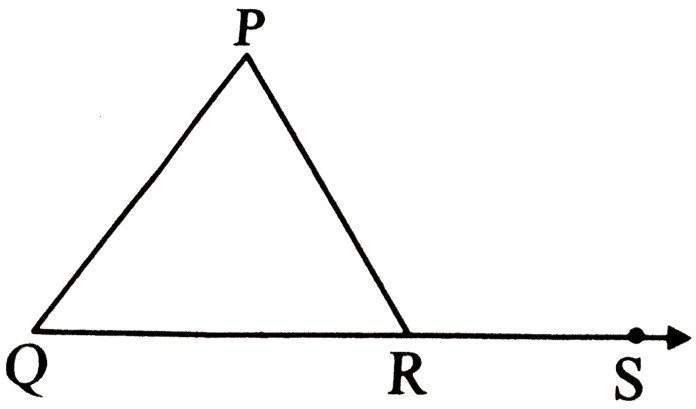
Triangles

1. In the givne figure , $\angle PRS$ is the exterior angle of ΔPQR . If $\angle P = 55^\circ$ and $\angle Q = 64^\circ$, then find $\angle PRS$.



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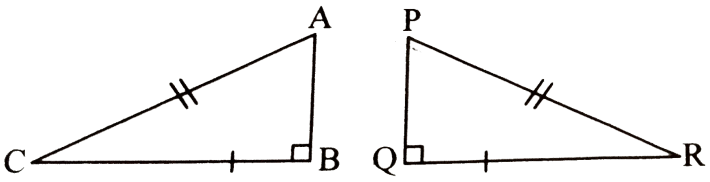
2. In the figures given below, equal parts of triangles are marked with the same signs. Observe the figures and state the test by which the two triangles are congruent.



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3. Which of the following is not the test of congruence of two triangles ?

ASA test ,AAS test, SSA test , SAS test.

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4. The length of median on hypotenuse of a right angled triangle is7 cm . Find the length of the hypotenuse.

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5. If $\Delta RST \sim \Delta LMN$ then write the ratios of corresponding sides.

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6. The measures of angles of a triangle are in the ratio $3 : 5 : 7$. Find the measure of the smallest angle.

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7. The measures of angles of a triangle are $2x^\circ$, $3x^\circ$, and $4x^\circ$. What type of triangle is it ?

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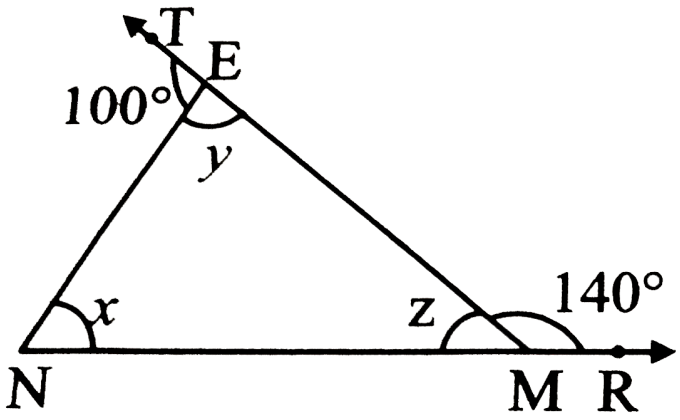
8. In the given figure, measures of some angles are given . Using the measures, find the values of x and y .



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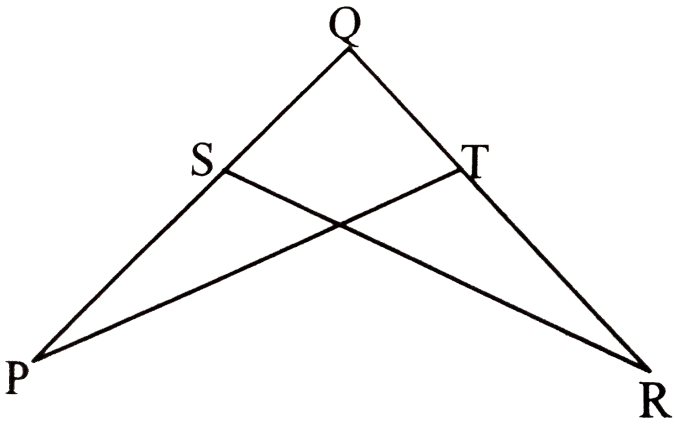
9. In the given figure, $\angle P \cong \angle R$, seg PQ $\cong$ seg RQ. Prove that $\Delta PQT \cong \Delta RQS$.



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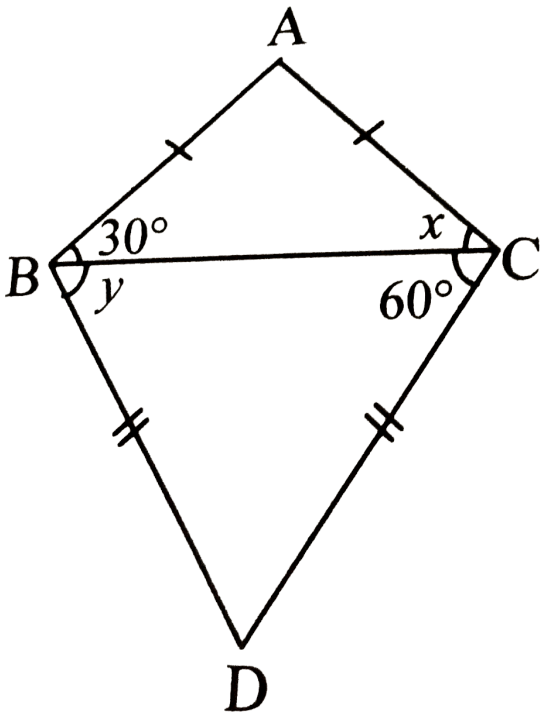
10. Find the values of x and y using the information shown in the figure.



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11. In $\Delta ABC, \angle BAC = 120^\circ$ and AB = AC, then find measure of $\angle ABC$.

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12. In ΔABC, $\angle B = 90^\circ$, AB = 8, BC = 6 and BD is a median . Find / (BD).

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13. In ΔABC, AB = 15 cm, BC = 12 cm and AC = 17 cm . Find out the greatest and smallest angle of ΔABC .

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14. In ΔLSN, if $\angle L = 80^\circ, \angle S = 40^\circ$, then find out the greatest and smallest sides of ΔLSN.

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15. If $\Delta APC \sim \Delta BPD$, BD = 2.4 cm, AC = 3.6 cm, PD = 4 cm and BP = 3.2 cm, then find AP and PC.

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Quadrilaterals

1. $\square PQRS$ is a parallelogram. If $\angle P = 60^\circ$ then find $\angle Q$

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2. $\square ABCD$ is a rectangle . If AC = 6 cm, then find BD.

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3. Diagonals SU and TV of rhombus STUV intersect each other at point W. Find $\angle SWT$.

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4. $\square LMNO$ is a square. Diagonlas LN and MO intersect each other at point S. Find $\angle SMN$

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5. If the diagonals of a quadrilateral are perpendcular bisectors of each other, then what type of quadrilateral is it ?

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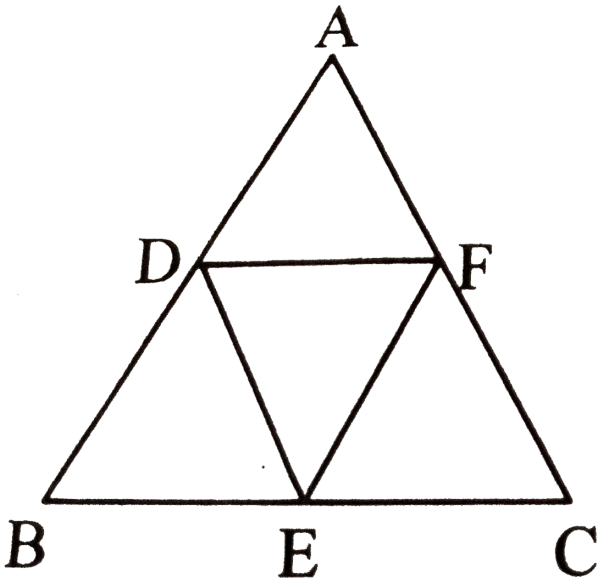
6. Points D, E and F are the midpoints of sides AB, BC, and AC of ΔABC . If DE = 10 cm, EF = 12

cm and DF = 8 cm, then find AB.



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7. Write the type of triangle formed by joining the midpoints of the sides of an equilateral triangle.

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8. If the adjacent angles of a parallelogram are in the ratio 4 : 5, then find the measures of these angles.

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9. In parallelogram ABCD, if $\angle A = (7x + 40)^\circ$ and $\angle C = (2x + 80)^\circ$, then find $\angle A$.

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10. The lengths of adjacent sides of a parallelogram are 5 cm and 12 cm. find the perimeter of the parallelogram.

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11. The diagonals of rectangle ABCD intersect at O . If $\angle AOD = 40^\circ$, then find $\angle OAD$

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12. The adjacent sides of a rectangle are 9 cm and 40 cm. Find the length of its diagonla.

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13. Find the length of the side of a square if the length of its diagonal is 12 cm .

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14. State with reason whether the given statement is true or false.

Every parallelogram isa rhombus.

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15. State whether the statement 'every rectangle is a parallelogram, is true of false. Justify.

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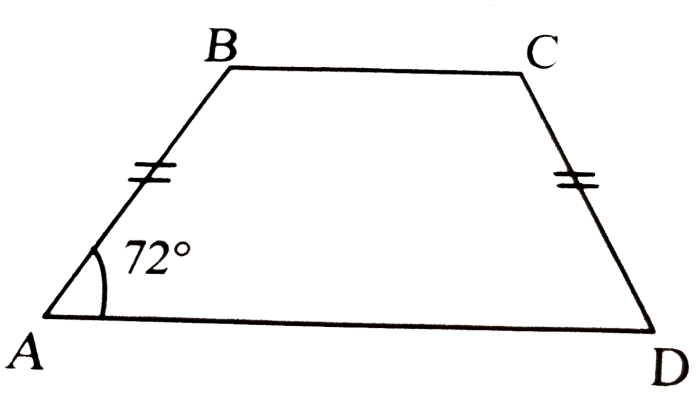
16. In trapezium ABCD, side BC $||$ side AD, side AB $\cong$ side DC. If $\angle A = 72^\circ$, then find the

measures of $\angle B$ and $\angle D$.



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Surface Area And Volume

1. The edge of a cube is 4 cm . Find the ratio of its tota surface area to the area of its vertical

faces.

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2. Find the volume of a cube with side 6 cm.

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3. The dimensions of a cuboid in cm $30 \times 18 \times 10$. Find its volume.

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4. A cuboidal box open at the top has length, breadth and height 20 cm, 16cm and 10 cm respectively . Find its volume.

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5. The volume of a cube is $1000 cm^3$. Find its side.

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6. How many surfaces does a cone have ?

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7. The radius and slant height of a cone are 4 cm and 25 cm respectively. Find the curved surface area of that cone.$(\pi = 3.14)$

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8. If the radius and the perpendicular height of a cone and cylinder is equal then write the ratio of their volumes.

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9. The diameter of a sphere is 6 cm. Find the total surface area of the sphere. $(\pi = 3.14)$

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10. The volume of a cube is $1,000\ cm^3$. Find its total surface area.

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11. If the edge of a cube is increased two times, then what will happen to tis volume ?

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12. Volume of a cuboid is 520 cm^3 . The tength and breadth of the cuboid are 10 cm and 6.5 cm respectively . Find its height.

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13. 2 cubes, each of volume 125 cm^3, are joined end to end . Find the surface area of the resulting cuboid.

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14. If the height and volume of a cylinder are 15 cm and 3000 cm^3 respectively . Find the are of its base.

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15. Curved surface area of a cylinder is 8800 cm^2 and the radius of its base is7 cm . Find the height of the cylinder.

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16. If the radius and height of a road roller are 0.5 m and 1.4 m respectively, then find the area of field pressed in 100 rotations.

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17. The radius of base and perpendiular height of a cone are 12 cm and 16 cm respectively. Find its slant height .

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18. The total surface area of a cone is 704 cm^2 and the radius of its base is 7 cm . Find its slant height .

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19. The radius and slant height of a cone are 5 cm and 10 cm respectively . Find the ratio of the curved surface area to the total surface area of cone.

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20. The radius of a cone is reduced to half . What should be done to its slant height so that curved surface area remains unchanged .

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21. Find the volume of a sphere of radius $3.5cm(\pi = 3.14)$

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22. Find the radius of a hemisphere if its volume is $144\pi cm^3$.

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23. Is the following statement true or false.

The radius of a sphere and hemisphere is the same . If the surface area of the sphere is 400 cm^2 then the total surface area of the hemisphere will be 200 cm^2

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24. If the radius of a sphere is equal to the diameter of a hemisphere. Find the ratio of volume of sphere to that of the hemisphere.

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25. The volume of a hemisphere is four times that of a sphere. Find the ratio of the radius of the hemisphere to that of the sphere.

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Chapter 1 Linear Equations In Two Variable

1. Draw the graphs representing the equations $4x + 3y = 24$ and $3y = 4x + 24$ on the same graph paper. Find the area of the triangle formed by these lines and the X-axis.

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2. Graphically, solve the following pair of equations

2x+y=6 and 2x-y+2=0

Find the ratio of the areas of the two triangles formed by the lines representing these equations with the X-axis and the lines with the y-axis.

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3. Sum of two numbers is 97. If the greater number is divided by the the smaller, the quotient is 7 and the remainder is 1. Find the numbers.

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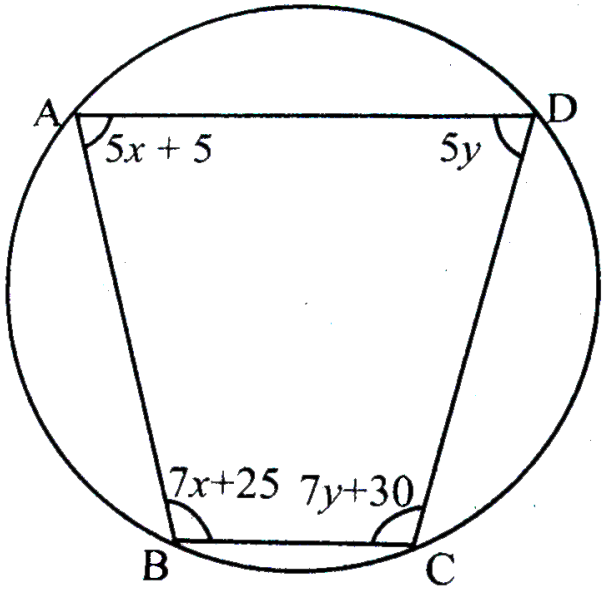
4. ABCD is a cyclic quadrilaterial , find it's angles .



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5. Ankita travels 14km to her home partly by rickshaw and partly by bus. She takes half an hour if she travels 2 km by rickshaw, and the remaining distance by bus. On the other hand, if she travel 4 km by rickshaw and the remaining distance by bus, she takes 9 minute longer. Find the speed of the rickshaw and of the bus.

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6. Some part of journey of 555 km was completed by a car with speed 60 km/hr. Then the speed is increased by 15 km/hr and the journey is completed. If it takes 8 hours to reach, find the time taken and distance covered by 60 km/hr.

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1. Factorise 11227 by representing this number in $ax^2 + bx + c$ form.

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2. Solve $5^{x+1} + 5^{2-x} = 5^3 + 1$

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3. Solve the following questions.

(ii) The roots of the equation

$x^2 - 3ax + b = 0$ differ by 4, then show that $9a^2 = 4b + 16$.

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4. If the difference between the roots of the equation $x^2 - px + q = 0$ is the same as the difference of the roots of the equation $x^2 - qx + p = 0$,show that $p + q + 4 = 0$ or p=q.

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5. The radius of a circle is greater than the radius of other circle by 3 m. The sum of their areas is $89\pi m^2$. Find the radius of each circle.

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6. A man bought a number of bicycles for Rs. 10,000 . He kept one for his own use and then sold the rest at a price of Rs. 50 more than the cost price. Besides getting his own bicycle for nothing,he made a profit of Rs. 450 . How many bicycles did he buy ?

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7. In a flight of 3000 km , an aircraft was slowed down due to bad weather . Its average speed fro the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the orignal duration of flight.

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8. Sum of areas of two squares is 244 cm^2 and the difference between their perimeter is 8 cm. Find the ratio of their diagonals.

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9. An open box is be made from a rectangular cardboard of sides 35 cm and 20 cm, by cutting equal squares from each corner and then bending up the edges. If the base area of

box thus formed is $250cm^2$, find the length of the side of the square cut from each corner.

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10. If the roots of the quadratic equation $ax^2 + cx + c = 0$ are in the ratio $p:q$ show that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{c}{a}} = 0$, where a, c are real numbers, such that $a > 0$

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11. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals,then prove that $2a^2c = c^2b + b^2a$

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Chapter 3 Arithmetic Progression

1. A man set out on a cycle ride of 50km. He covers 5km in the first hour and during each

successive hour his speed falls by $\frac{1}{4}$ km/hr. How many hours will be take to finish his ride?

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2. The ratio of the sums of m terms and n terms of an A.P. is $m^2 : n^2$. Prove that the ratio of their mth and nth term will be (2m - 1) : (2n-1).

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3. Insert five number between 4 and 8 so that the resulting sequence is an A.P.

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4. How many two digit numbers leave the remainder 1 when divided by 5 ?

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Chapter 4 Financial Planning

1. A retail trader purchased certain CCTV's from a wholesaler who had purchased the same from a manufacture . In each transaction the concerned seller leived 18% GST. Wholesaler earned a profit of 25% . If retail trader paid Rs. 51344.75 for this transaction, then what is the original price for the manufacturer ?

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2. Mr. Joshi purchased 125 shares of FV 100 for market value of 90. After taking 20% dividend in first year and 15% divided in second year. He sold all the shares when market value was 105. He paid 50 paise per share brokerage for each transaction done. Find the profit or loss in the transaction.

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3. Saraswati Collage purchase a computer for their lab. The discount of 10% was given on the printed price of computer. Rate of GST charged was 18% . Purchase price for computer is Rs. 47.790 . Find the printed price of computer.

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4. A Mumbai based trader dealing in sports material bought some sports material of Rs.

35,000 from Chandigarh . For this transaction he paid IGST at 12% . In turn he sold this material to a Mumbai based All Rounder Cricket club for Rs. 70,400 . This price includes Rs. 6,600 as 12% GST . Based on this calculate GST payable by the trader.

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Chapter 5 Probability

1. The probability of getting 53 Fridays in a leap year is :

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2. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

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3. A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball from the bag is twice that of a red ball, find the number of blue balls in the bag.

4. The king, queen and jack of clubs are removed from a deck of 52 playing cards and then well shuffed . Now one card is drawn at

random from the remaining cards. What is the probibility that the cards is a club

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5. The king, queen and jack of clubs are removed from a deck of 52 playing cards and then well shuffed . Now one card is drawn at random from the remaining cards. What is the probibility that the cards is 10 of hearts.

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6. All the jacks , queens and kings are removed from a deck of 52 playing, cards . The remaining cards are well shuffled and then one card is drawn at random. Giving ace a value 1 similar value for other cards, find the probability that the card has a value 7

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7. All the jacks , queens and kings are removed from a deck of 52 playing, cards . The remaining cards are well shuffled and then

one card is drawn at random. Giving ace a value 1 similar value for other cards, find the probability that the card has a value greater than 7

8. All the jacks , queens and kings are removed from a deck of 52 playing, cards . The remaining cards are well shuffled and then one card is drawn at random. Giving ace a value 1 similar value for other cards, find the

probability that the card has a value less than 7

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Chapter 6 Statistics

1. Calculate the mean of daily income (in Rs.) of the following data about men working in a company by using step deviation method .

Daily income (in ₹)	< 100	< 200	< 300	< 400	< 500
Number of men	12	28	34	41	50

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2. The mean of the following frequency distibution is 20. Determine the value of x .

Class	Frequency (f_i)	Class mark (x_i)	$f_i x_i$
0 – 10	5	5	25
10 – 20	$6x$	15	$90x$
20 – 30	$3x$	25	$75x$
30 – 40	x	35	$35x$
40 – 50	$2x$	45	$90x$
Total:	$\Sigma f_i = 12x + 5$		$\Sigma f_i x_i = 290x + 25$

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3. The following table gives the result of certain examination for 180 students .

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	10	x	25	$2x$	55	30

i. Find the value of x.

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4. The marks scored by students in Mathematics in a certain examinations are given below:

Marks Scored	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Number of students	3	8	15	17	7

Draw histogram for the above data.

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