MATHS

BOOKS - TARGET PUBLICATION

CHALLENGING QUESTIONS

Similarity

1. In $\square ABCD$, side $BC \mid\mid$ side AD. Digonals AC and BD intersect each other at P. If $AP = \frac{1}{3}AC$ then prove $DP = \frac{1}{2}BP$.

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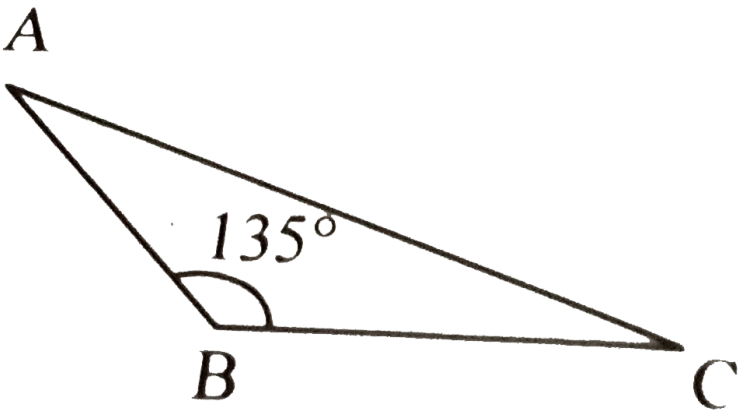
Pythagoras Theorem

1. In $\Delta ABC, \angle ABC = 135^\circ$. Prove that : $AC^2 = AB^2 + BC^2 + 4A(\Delta ABC)$.



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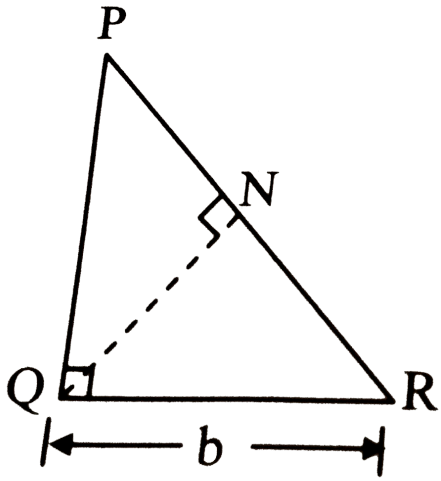
2. ΔPQR is a right angled triangle, right angled at Q such that QR = b and $A(\Delta PQR)$ = a if QN $\perp$ PR then show that $QN = \dfrac{2a.\,b}{\sqrt{b^4 + 4a^2}}$



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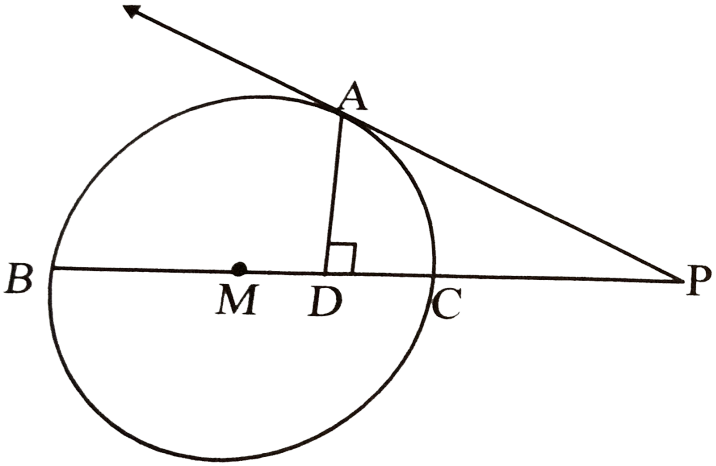
Circle

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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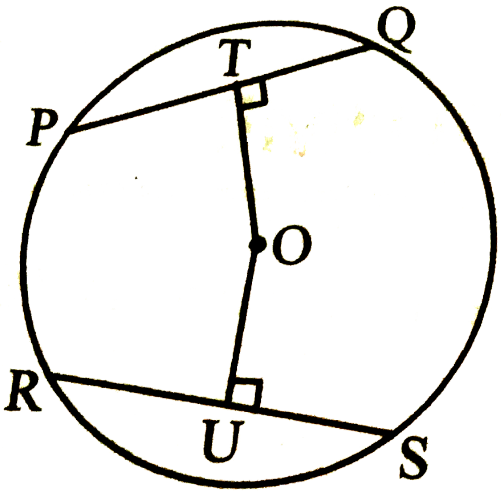
4. In the given figure, O is the center and chord PQ = Chord RS.

If OT = 5 cm, then find OU.



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

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6. 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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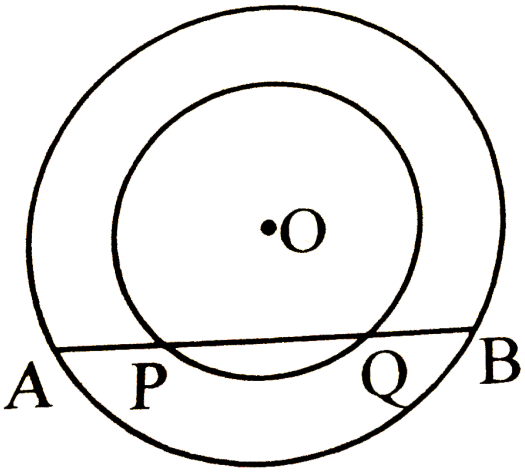
7. In the given figure, centre of two circles is O. Chord AB of bigger

circle intersects the smaller circle in points P and Q .

Show that AP = BQ.



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Co Ordinate Geometry

1. Points A(-1, y) and B(5, 7) lie on a circle with centre O(2, -3y).

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 circle 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. 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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7. Write the equation of line parallel to Y-axis and at a distance of

5 units to its left.

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

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9. Write the equation of x axis.

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10. Y- axis and line x =-4 are parallel lines . What is the distance

between them ?

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11. If 'b' is a real number, then what is the distance between lines

$y = b$ and $y = -b$?

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12. How many lines are there which are parallel to the x-axis and having a distance 5 units ? Write their equations.

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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

$$\frac{1+\sin x-\cos x}{1+\sin x+\cos x}+\frac{1+\sin x+\cos x}{1+\sin x-\cos x}=2+2\text{cosec}\ x$$

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4. The angle of elevation of a jet plane from a point A on the ground

is 60° . After a flight of 30 seconds, the angle of

elevation changes

to 30° . 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 depressions of Vashi bridge and Wrli sea - link are 60° and 30° respectively . If the aeroplane is at a height of $5500\sqrt{3}m$ at that time, what is the distance between Vashi bridge and Wrli sea - link ?

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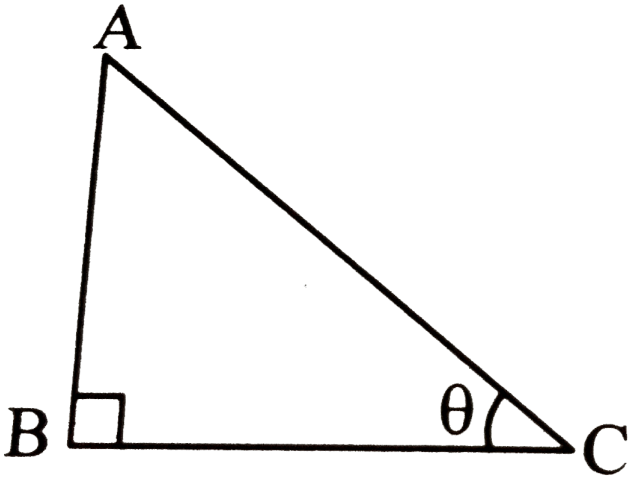
6. If in $\Delta ABC, \angle B = 90^\circ$ and $\angle C = \theta$, then write the ratios

sin θ and tan θ



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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 $\cos\theta$ if θ is in 1st quadrant.

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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 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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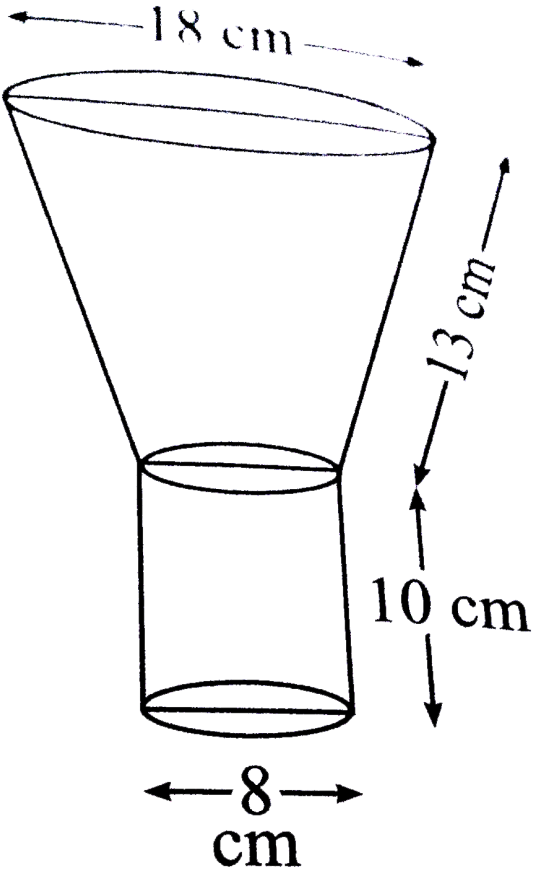
3. An oil funnel of tin sheet consists of a cylindrical portion 10 cm long attached to a frustum of cone. The

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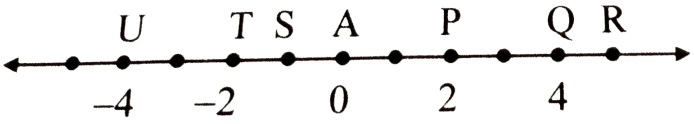
5. Answer the following question with the help of the figure given below .

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, state so.

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 of point B on the number line is -3. Find the co-ordinates of the points which are at a distance 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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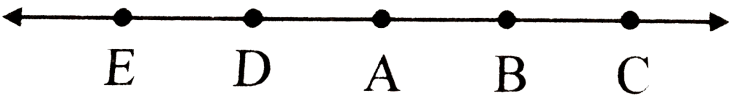
13. Answer the following question with the help of figure given below .



(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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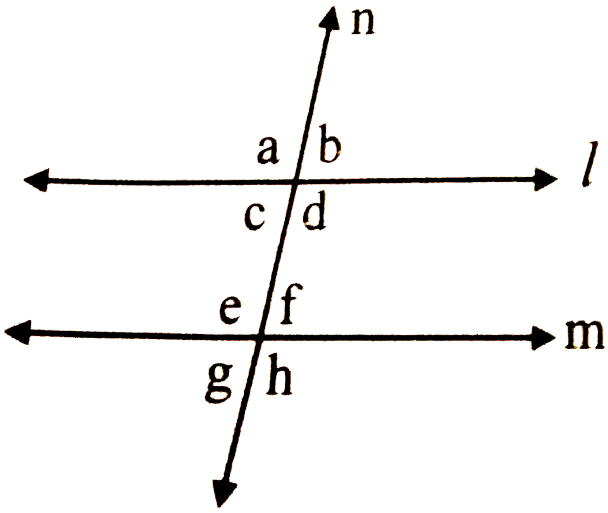
Paralles Lines

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. If two lines are parallel, then what can you say about the pairs

of corresponding angles formed by their transversal ?

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

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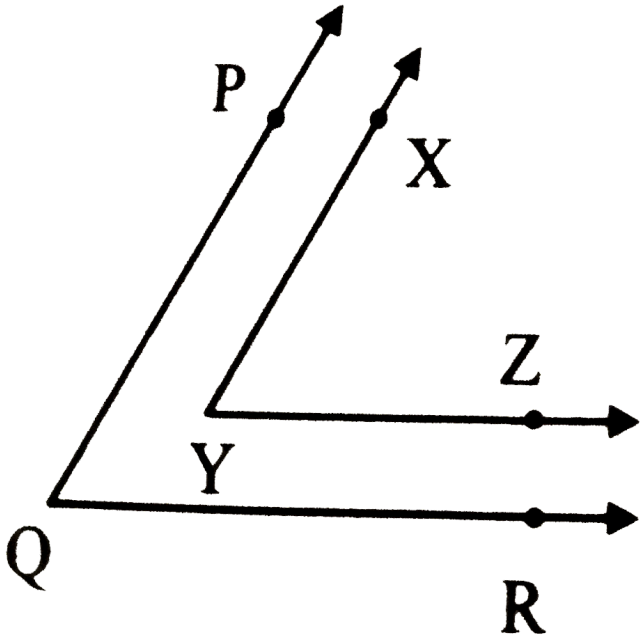
4. In the given figure sides of $\angle PQR$ and $\angle XYZ$ are parallel to each other. Prove that, $\angle PQR \cong \angle XYZ$.



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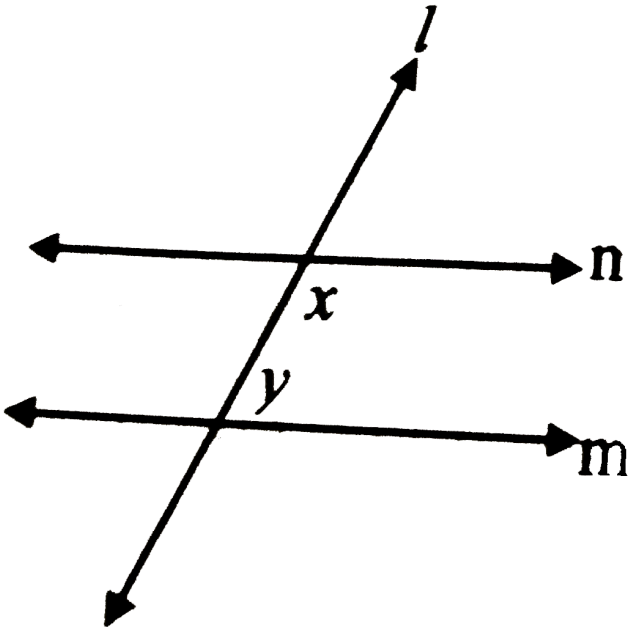
5. In the given figure, if $x = 125^\circ$ and $y = 54^\circ$ then are lines m and n parallel ? Justify.



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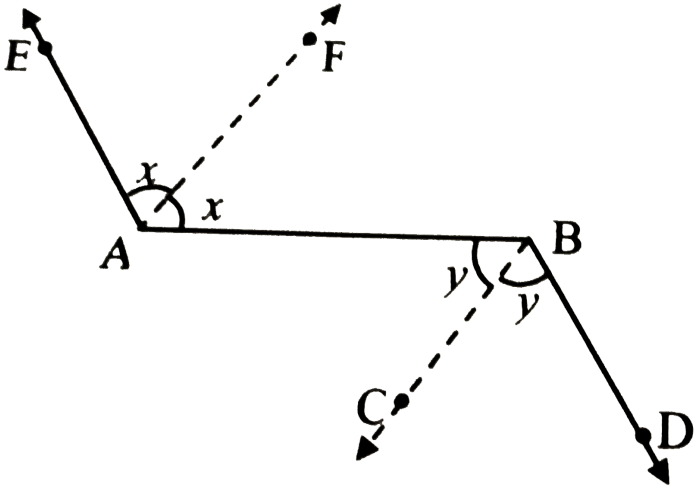
6. In the given figure, ray AE || ray BD, ray AF is the bisector of $\angle EAB$ and ray BC is the bisector of $\angle ABD$. Prove that lineAF || line BC.



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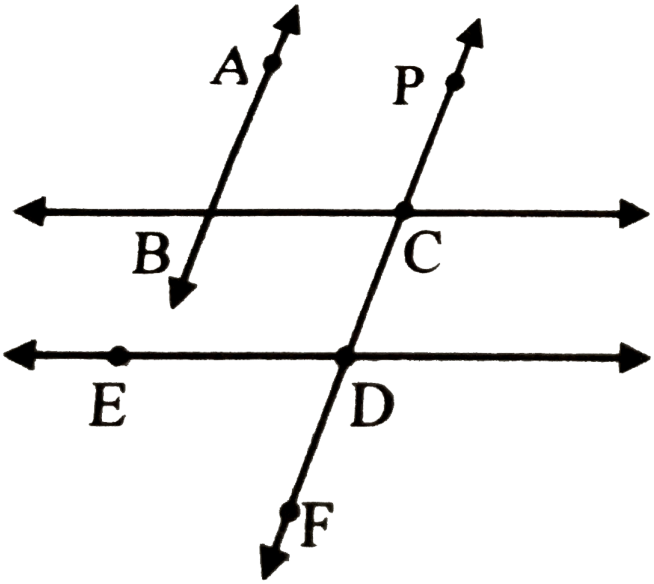
7. In the given figure, if line AB || line CF and line BC || line ED,

then prove that $\angle ABC = \angle FDE$.



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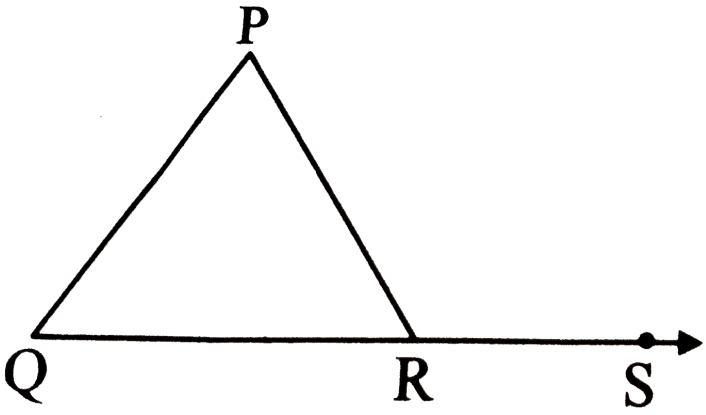
Triangles

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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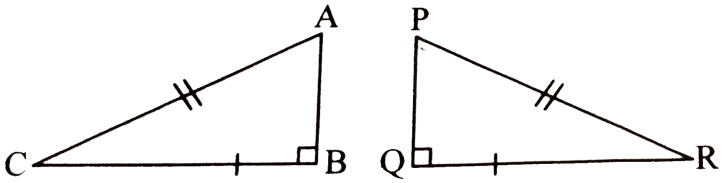
2. In the figures given below, equal parts of triangles are marked with

the same signs. Observe the figures and state the test

by which the

two triangles are congruent.



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3. The length of median on hypotenuse of a right angled

triangle is 7 cm . Find the length of the hypotenuse.

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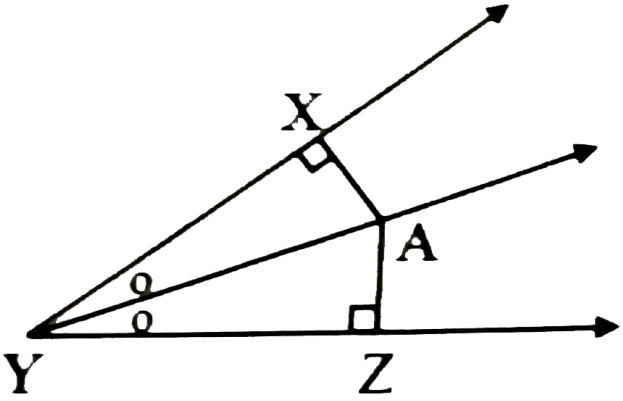
4. In the given figure, point A is on the bisector of $\angle XYZ$.

If AX = 2 cm, then find AZ.



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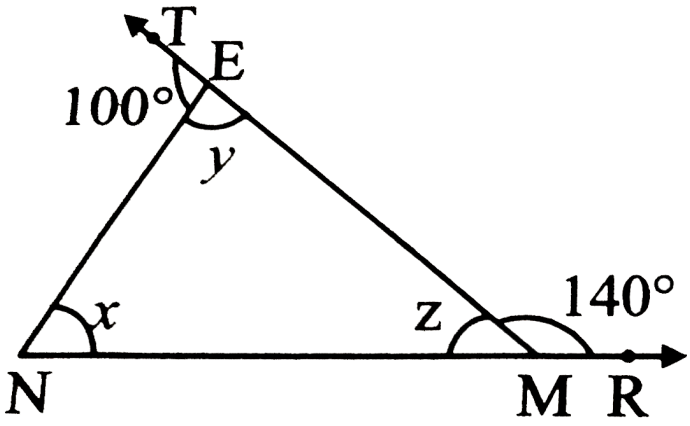
8. In the given figure, measures of some angles are given . Using the measures, find the values of x and y .



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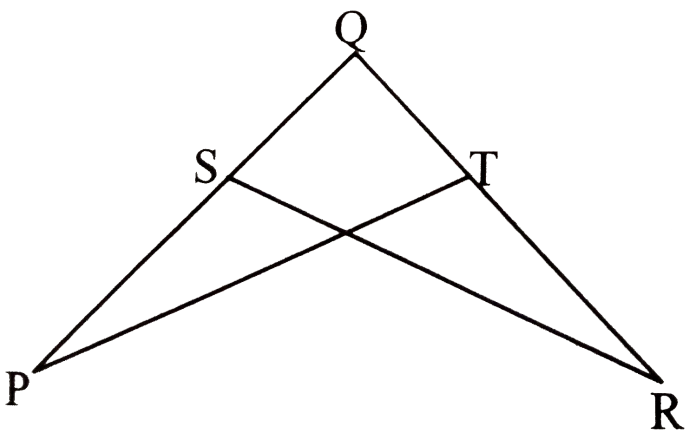
9. In the given figure, $\angle P \cong \angle R$, seg PQ $\cong$ seg RQ. Prove that $\Delta PQT \cong \Delta RQS$.



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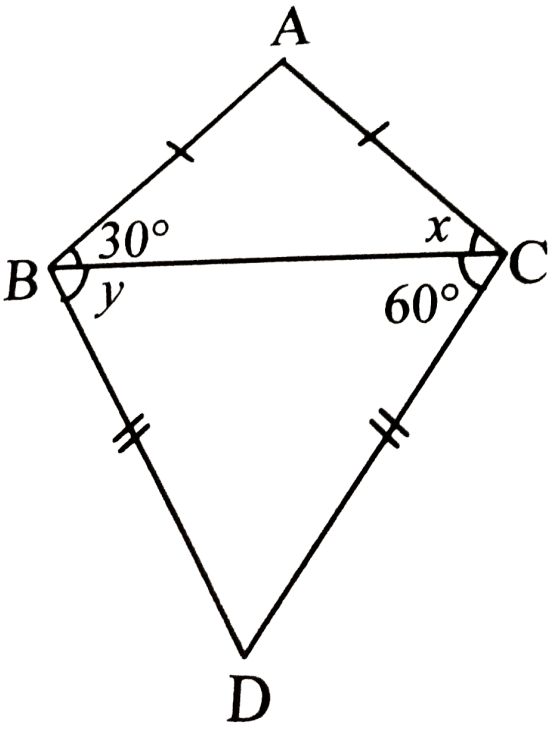
10. Find the values of x and y using the information shown in the figure.



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11. In ΔABC, $\angle BAC = 120^\circ$ 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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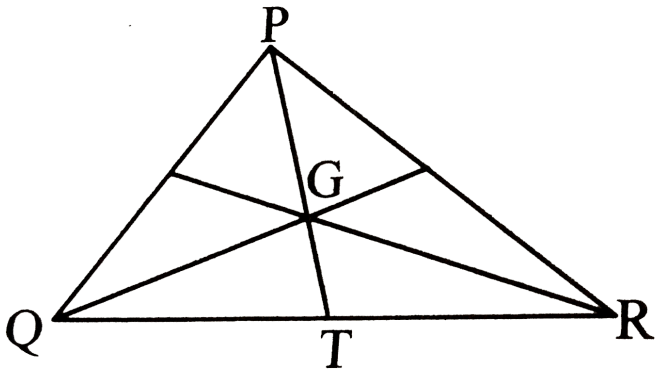
13. In the given figure point G is the pointof concurrence of the medians of ΔPQR . If GT = 2.5,

then find the length of PG.



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14. 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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15. 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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16. 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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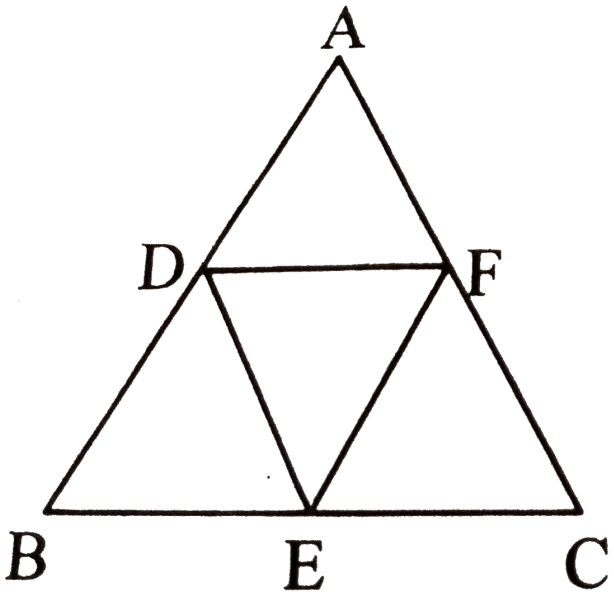
6. Points D, E and F are the midpoints of sides AB, BC, and AC of ΔABC . If DE = 10 cm, EF = 12 cm and DF = 8 cm, then find AB.



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

then find $\angle A$.

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9. The lengths of adjacent sides of a parallelogram are 5 cm and 12 cm.

find the perimeter of the parallelogram.

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10. The diagonals of rectangle ABCD intersect at O.

If $\angle AOD = 40^\circ$, then find $\angle OAD$

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11. Adjacent sides of rectangle are 9 cm and 40 cm.

Find diagonal.

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

is 12 cm .

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

Every parallelogram is a rhombus.

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14. State whether the statement 'every rectangle is a parallelogram,

is true or false. Justify.

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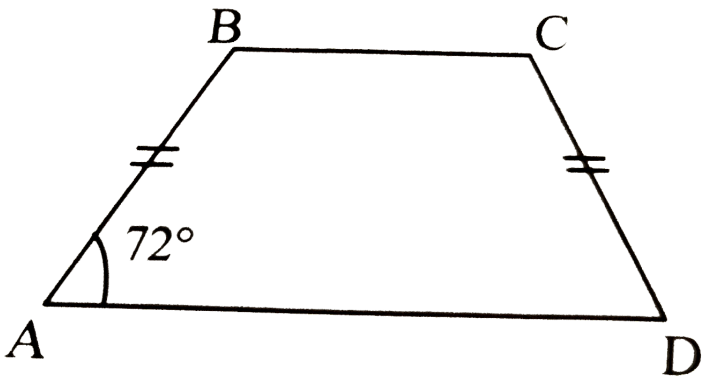
15. In trapezium ABCD, side BC $||$ side AD, side AB $\cong$ side DC.

If $\angle A = 72^\circ$, then find the measures of $\angle B$ and $\angle D$

.



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Surface Area And Volume

1. Side of a cube is 4 cm. Find ratio of its total surface area and vertical surface area.

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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. Volume of a cube is $1000cm^3$. 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 length 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 area of its base.

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

base is 7 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. 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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