MATHS

BOOKS - NAND LAL PUBLICATION

THE TRIANGLE AND ITS PROPERTIES

Try These

1. Can you name the angle opposite to the sides AB in a triangle ABC ?

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2. Write the six elements (i.e., the 3 sides and the 3 angles) of $\triangle$ ABC

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3. Write the :

Side opposite to the vertex Q of $\triangle PQR$

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4. Write the :

Angle opposite to the side LM of $\triangle LMN$

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5. Write the :

Vertex opposite to the side RT of $\triangle RST$

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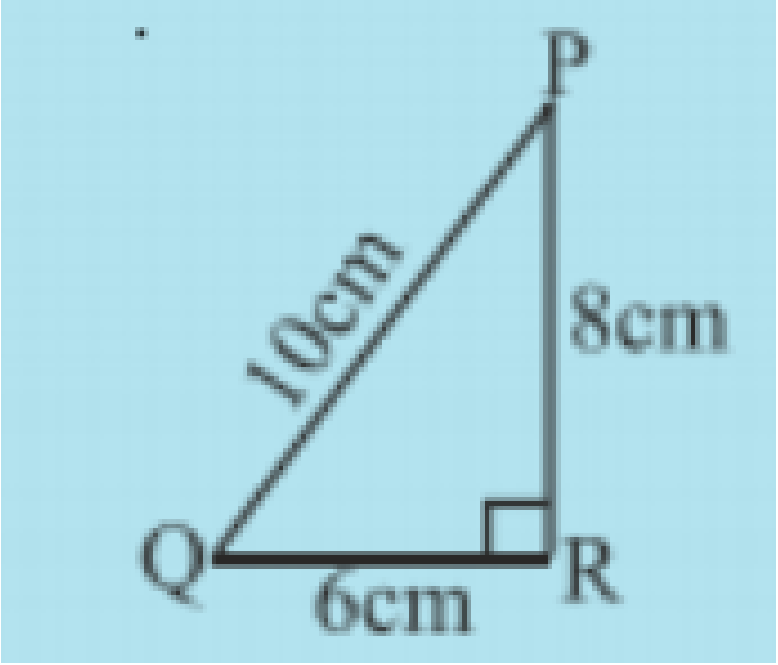
6. Look at fig and classify each of the triangles according to its

Sides

Angles



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7. An exterior angle of a triangle is of measure 70° and one of its interior opposite angles is of measure 25°. Find the measure of interior opposite angle.

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8. The two interior opposite angles of an exterior angles of a triangle are 60° and 80°. Find the measure of the exterior angle.

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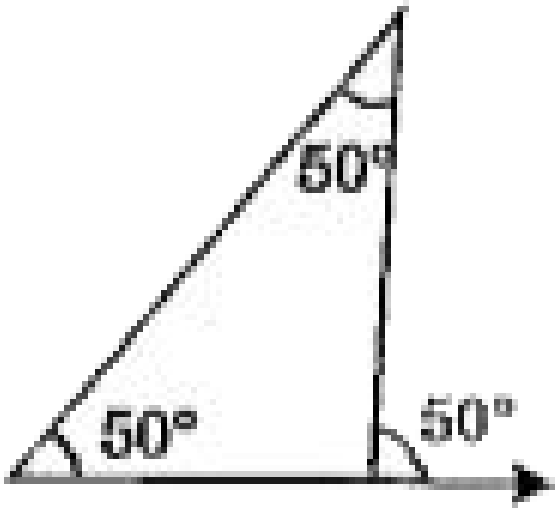
9. Is something wrong in this diagram (fig 6.12)? Comment



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10. Two angles of a triangle are 30° and 80°. Find the third angle.

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11. One of the angles of a trianlge is 80° and the other two angles are equal. Find the measure of each of the equal angles.

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12. The three angles of a triangle are in the ratio 1:2:1. Find all the angles of the triangle. Classify the triangle in two different ways.

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13. Find angle x in each figure

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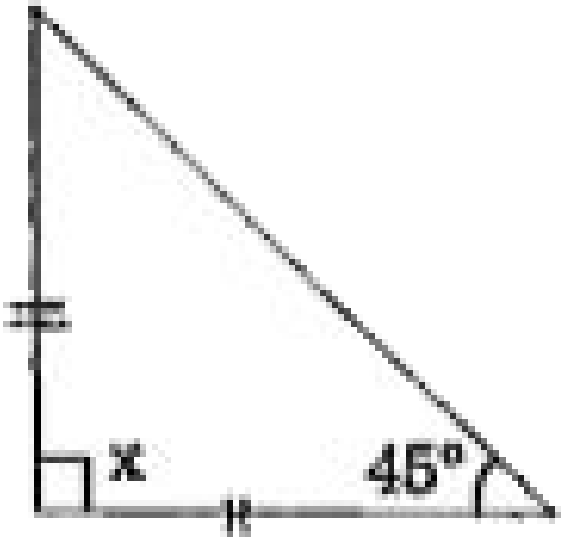
14. Find angle x in each figure



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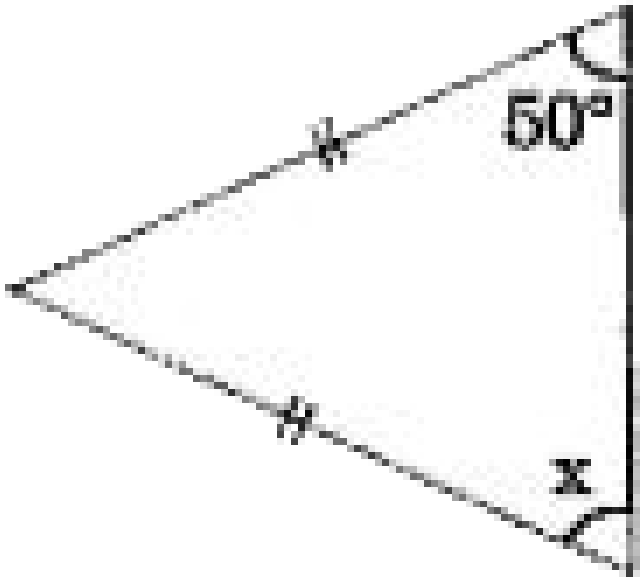
15. Find angle x in each figure



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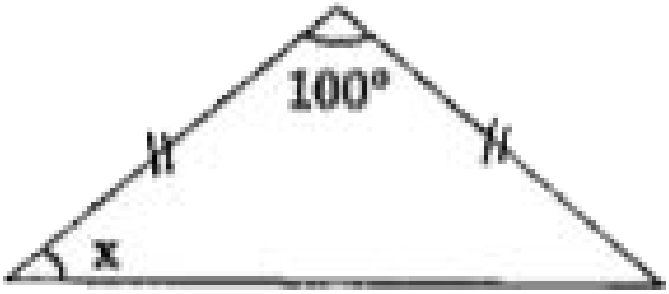
16. Find angle x in each figure



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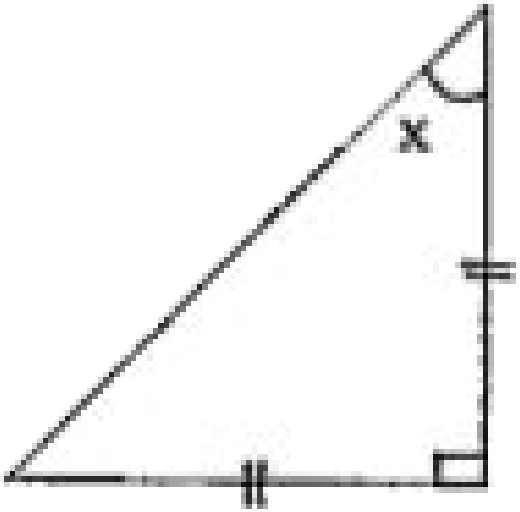
17. Find angle x in each figure



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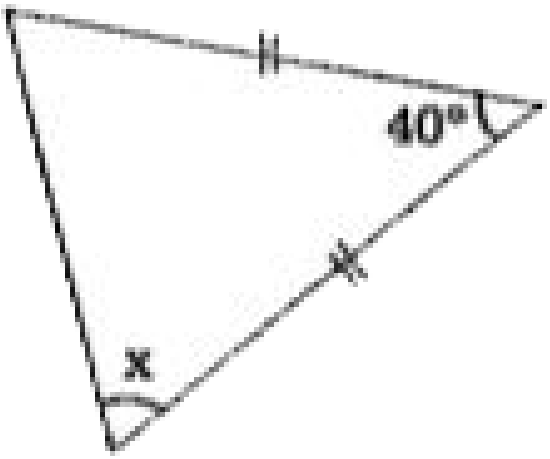
18. Find angle x in each figure



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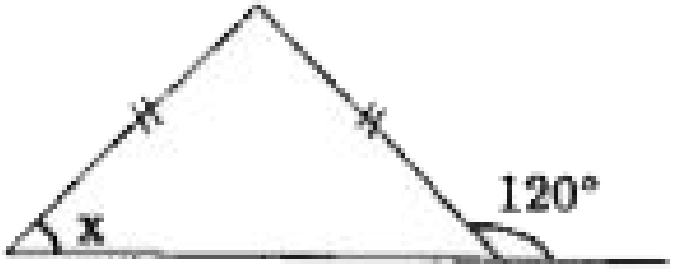
19. Find angle x in each figure



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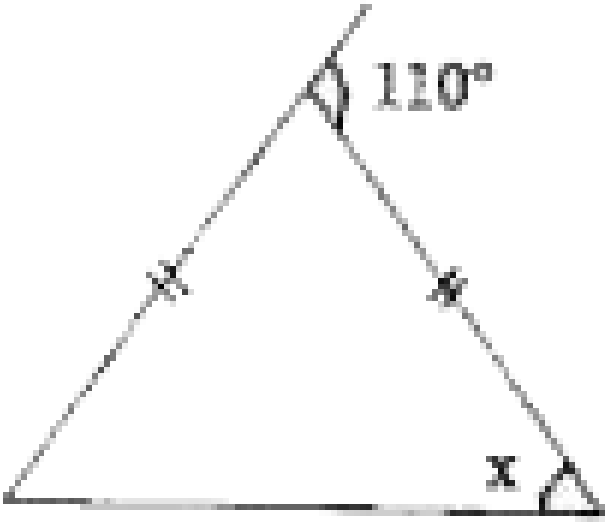
20. Find angle x in each figure



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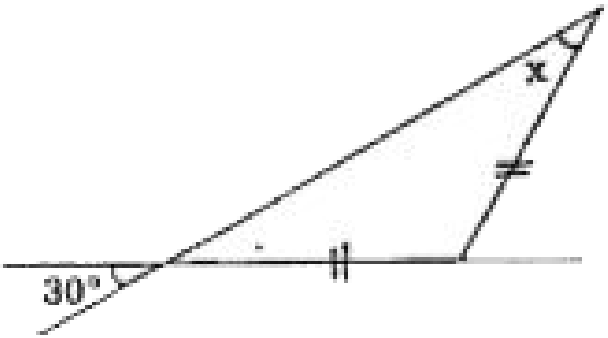
21. Find angle x in each figure



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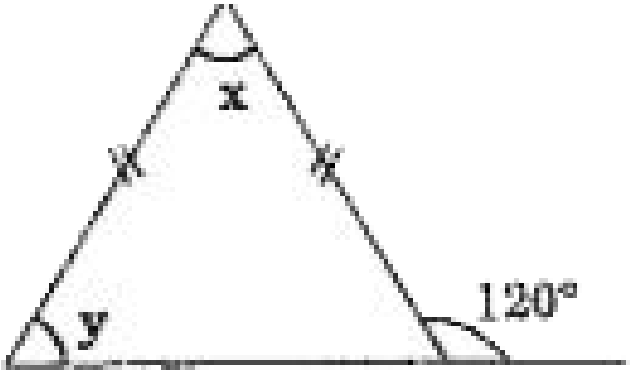
22. Find angles x and y in each figure



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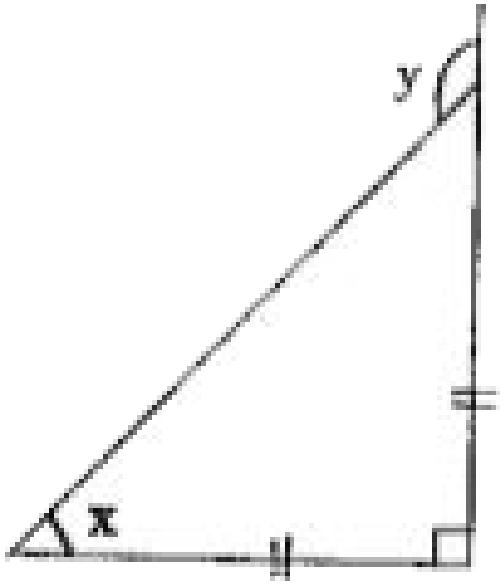
23. Find angles x and y in each figure



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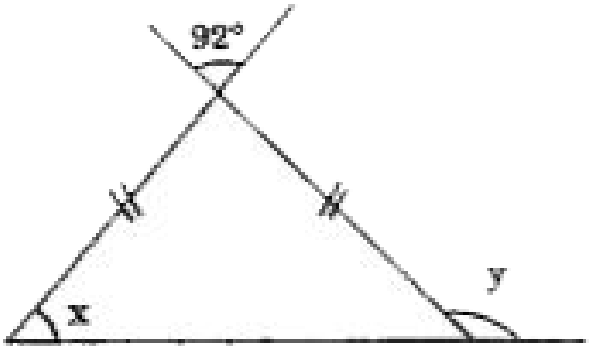
24. Find angles x and y in each figure



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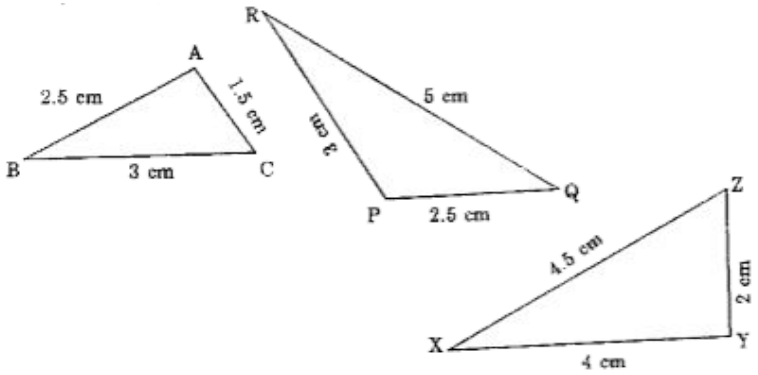
25. Draw any three triangles, say $\Delta ABC, \Delta PQR$ and ΔXYZ in your

notebook. (fig. 6.22)



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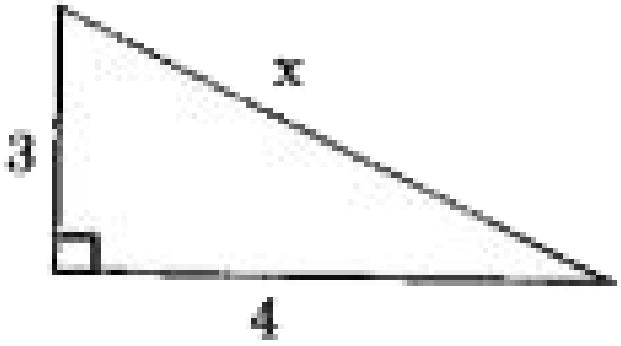
26. Find the unknown length x in the following figure (fig.6.29)



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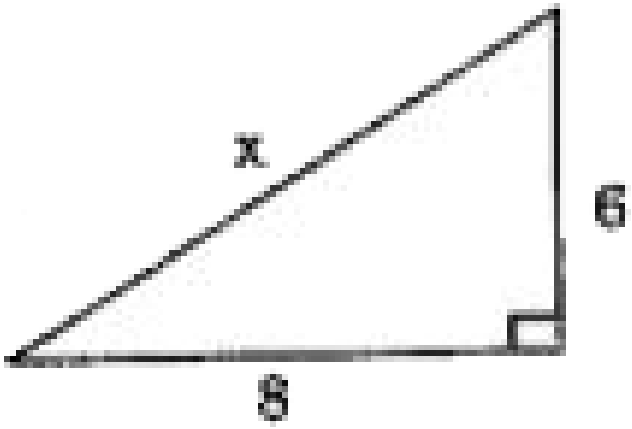
27. Find the unknown length x in the following figure (fig.6.29)



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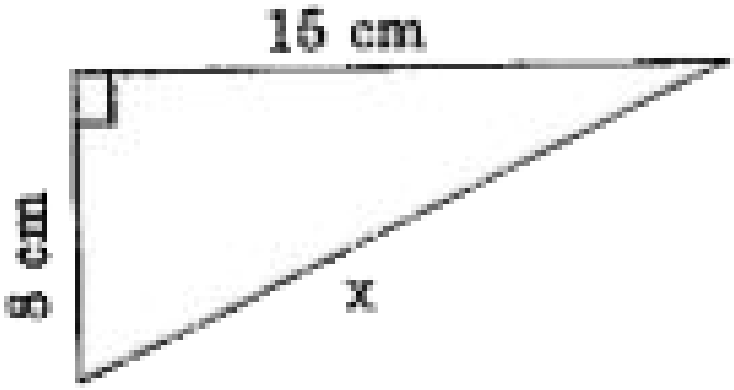
28. Find the unknown length x in the following figure (fig.6.29)



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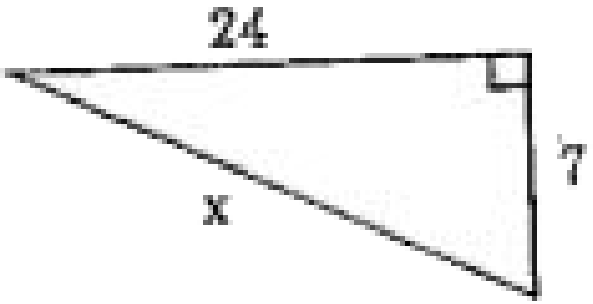
29. Find the unknown length x in the following figure (fig.6.29)



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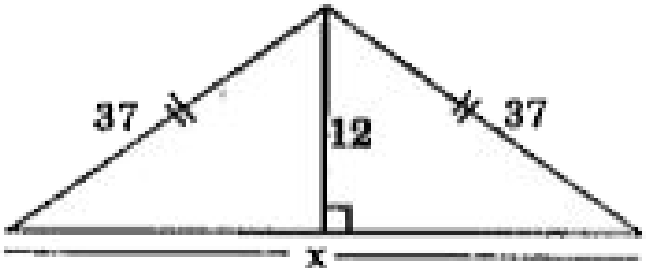
30. Find the unknown length x in the following figure (fig.6.29)



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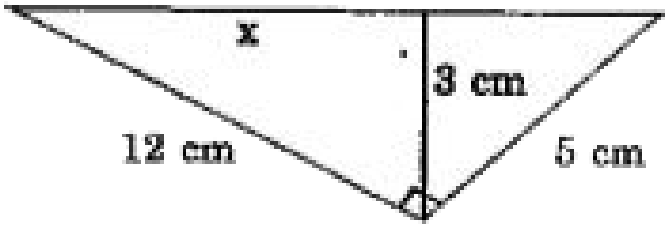
31. Find the unknown length x in the following figure (fig.6.29)



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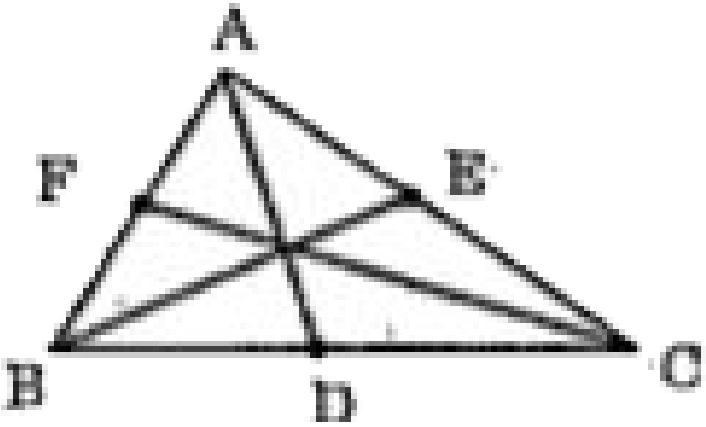
Think Discus And Write

1. How many medians can a triangle have ?



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2. Does a median lie wholly in the interior of the triangle? (If you think that this is not true,

draw a figure to show such a case).

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3. How many altitudes can a triangle have?

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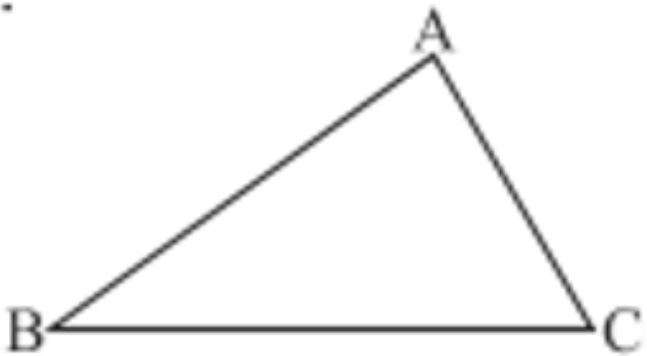
4. Draw rough sketches of altitudes from A to $\overline{BC}$ for the following triangles



Acute-angled

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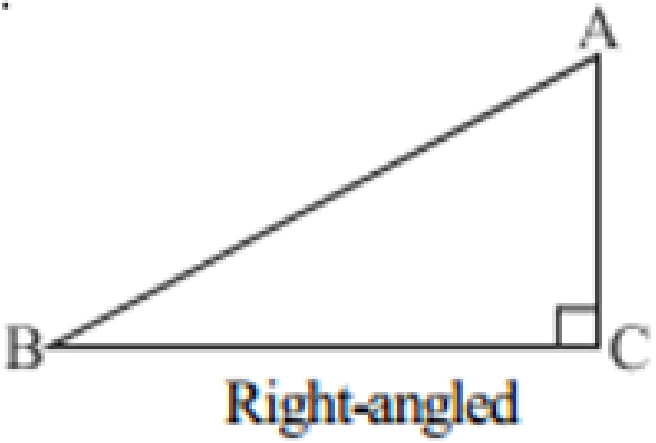
5. Draw rough sketches of altitudes from A to $\overline{BC}$ for the following triangles



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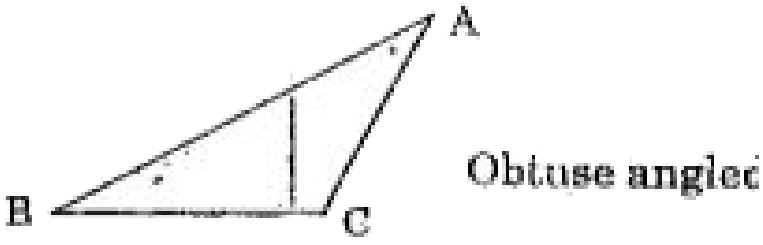
6. Draw the rough sketches of altitudes from A to $\overline{BC}$ for the following triangles (Fig 6.6)



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7. Will an altitude always lie in the interior of a triangle? If you think that this need not be true, draw a rough sketch to show such a case.

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8. Can you think of a triangle in which two altitudes of the triangle are two of its sides?

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9. Can the altitude and median be same for a triangle?

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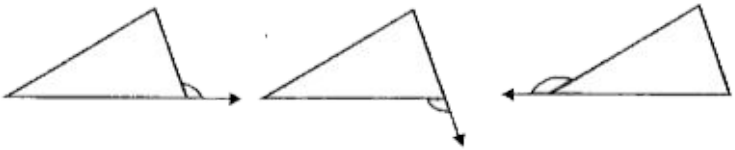
10. Exterior angles can be formed for a triangle in many ways. Three of them are shown here (fig. 6.10)



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11. Are the exterior angles formed at each vertex of a triangle equal?

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12. What can you say about the sum of an exterior angle of a triangle and its adjacent interior angle?

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13. What can you say about each of the interior opposite angles, when the exterior angle is

a right angle?

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14. What can you say about each of the interior opposite angles, when the exterior angle is

an obtuse angle?

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15. What can you say about each of the interior opposite angles, when the exterior angle is

an acute angle?

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16. Can the exterior angle of a triangle be a straight angle?

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17. Can you have a triangle with two right angles?

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18. Can you have a triangle with two obtuse angles?

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19. Can you have a triangle with two acute angles?

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20. Can you have a triangle with all the three angles greater than 60°?

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21. Can you have a triangle with all the angles equal to 60°?

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22. Can you have a triangle with all the three angles less than 60°?

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23. Is the sum of any two angles of a triangle always greater than the third angle?

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24. Which is the longest side in the triangle PQR, right-angled at P?

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25. Which is the longest side in the triangle ABC, right-angled at B?

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26. Which is the longest side of a right triangle?

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27. 'The diagonal of a rectangle produce by itself the same area as produced by its length and breadth'– This is Baudhayan Theorem. Compare it with the Pythagoras property.

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Do This

1. Take several cut outs of (i) an equilateral triangle, (ii) an isosceles triangle and (iii) a

scalene triangle.

Find their altitudes and medians. Do you find any thing special about them? Discuss it with your friends.

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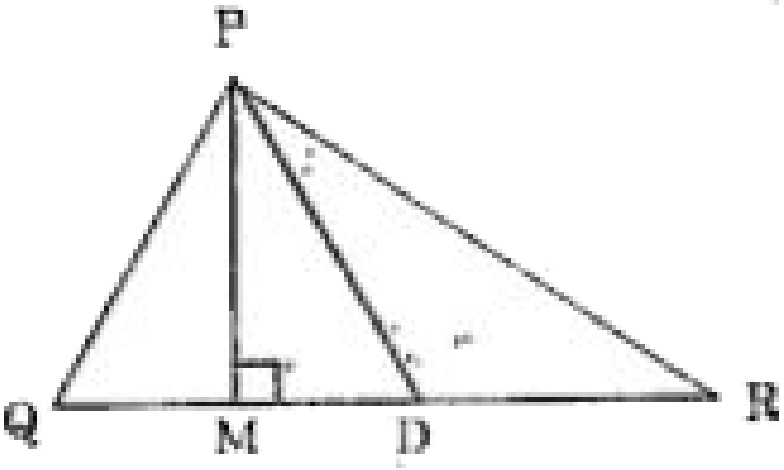
Exercise 1

1. In ΔPQR, D is the mid point of $\overline{QR}$

$\overline{PM}$ is .....

$\overline{PD}$ is .....

Is QM= MR?



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2. Draw rough sketches for the following:

In $\triangle ABC$,BE is a median.

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3. Draw rough sketches for the following:

In $\triangle PQR$,PQ and PR are altitude of the triangle.

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4. Draw rough sketches for the following:

In `triangleXYZ,YL is an altitude in the exterior of the triangle.

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5. Verify by drawing a diagram if the median and altitude of an isosceles triangle can be same.

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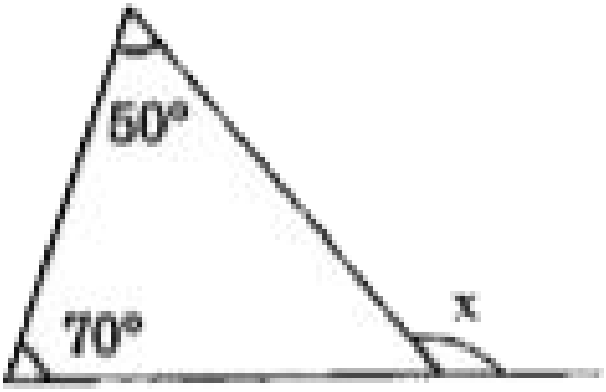
Exercise 2

1. Find the value of the unknown exterior angle x in the following diagrams



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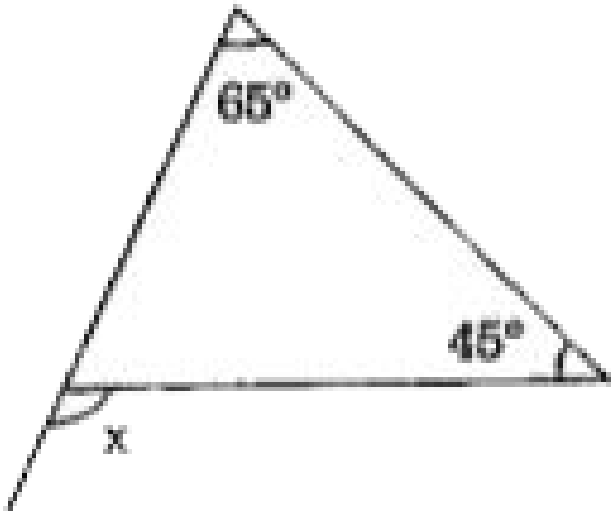
2. Find the value of the unknown exterior angle x in the following diagrams



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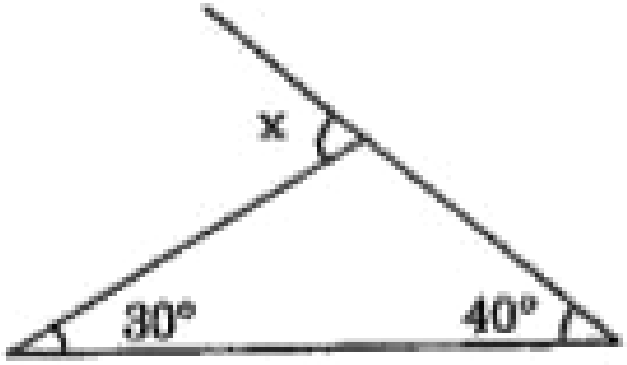
3. Find the value of the unknown exterior angle x in the following diagrams



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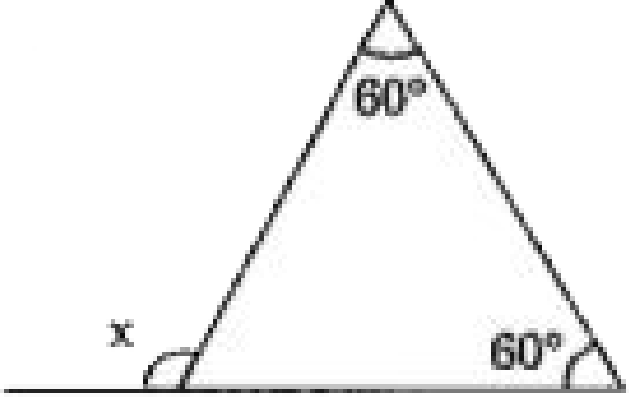
4. Find the value of the unknown exterior angle x in the following diagrams



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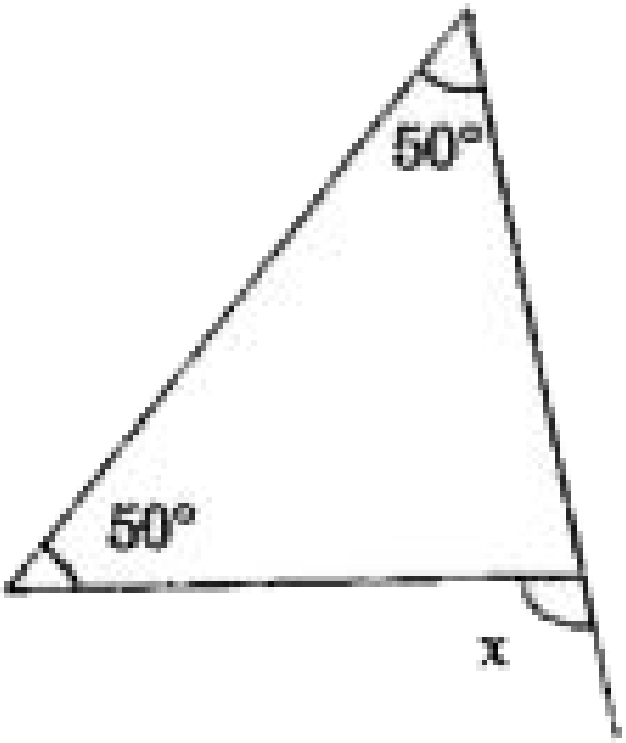
5. Find the value of the unknown exterior angle x in the following diagrams



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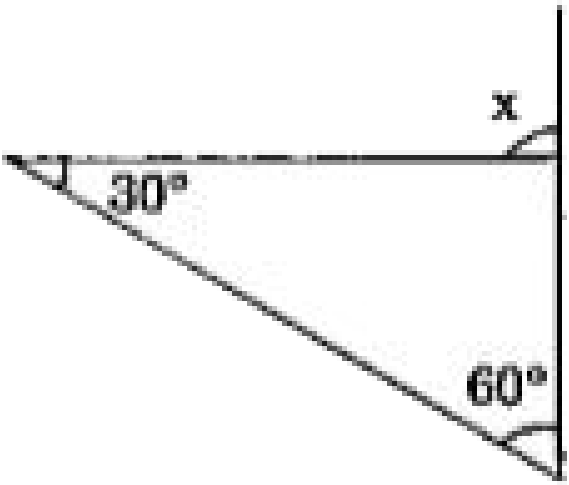
6. Find the value of the unknown exterior angle x in the following diagrams



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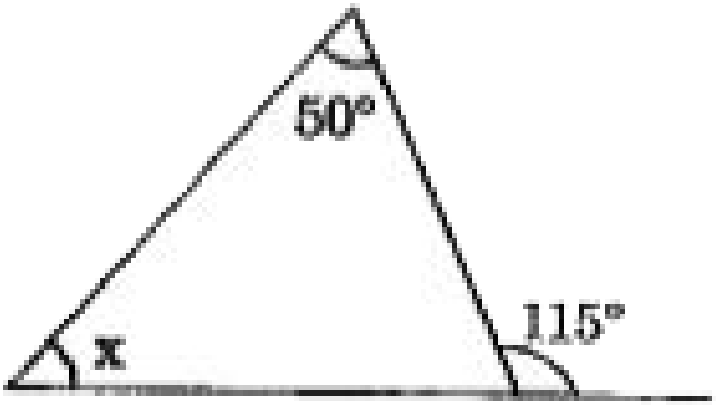
7. Find the value of the unknown interior angle x in the following figure



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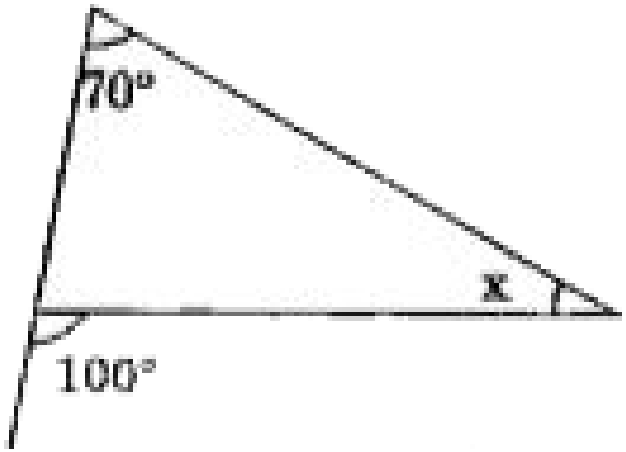
8. Find the value of the unknown interior angle x in the following figure



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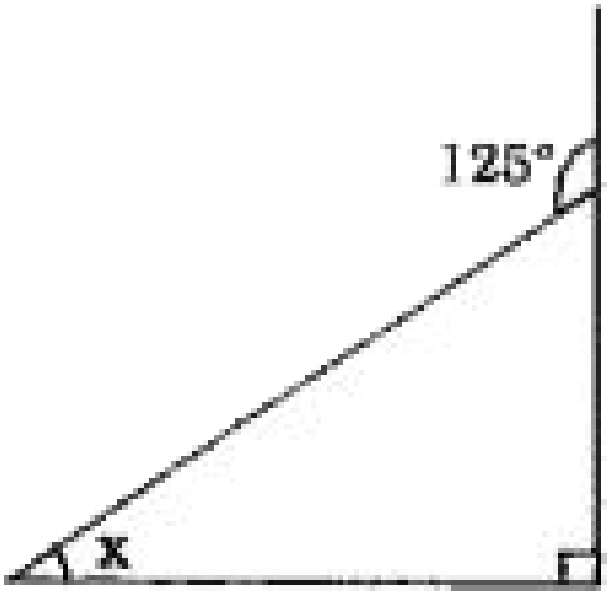
9. Find the value of the unknown interior angle x in the following figure



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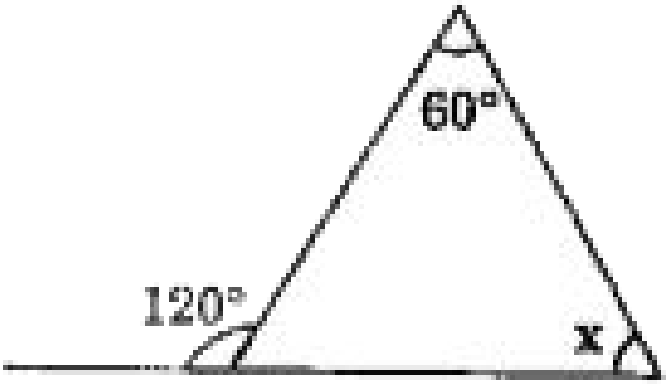
10. Find the value of the unknown interior angle x in the following figure



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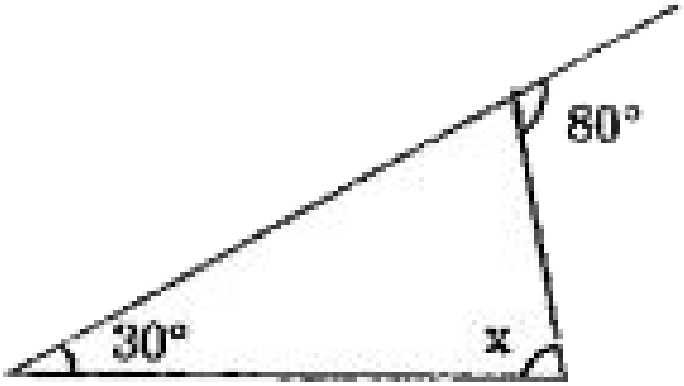
11. Find the value of the unknown interior angle x in the following figure



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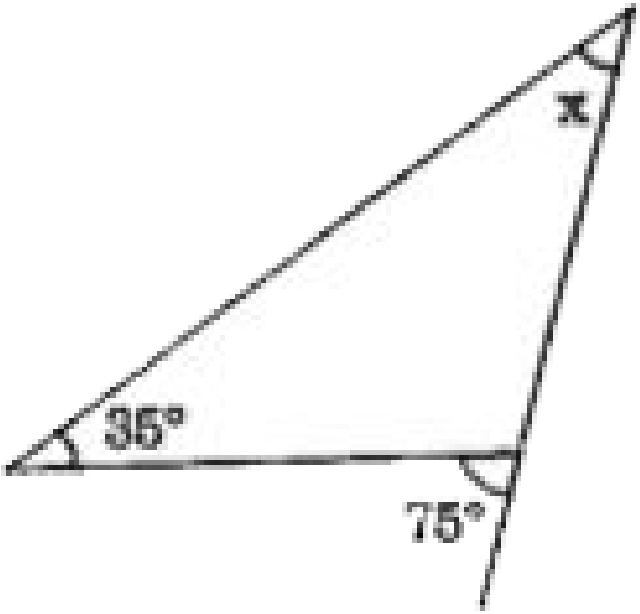
12. Find the value of the unknown interior angle x in the following figure



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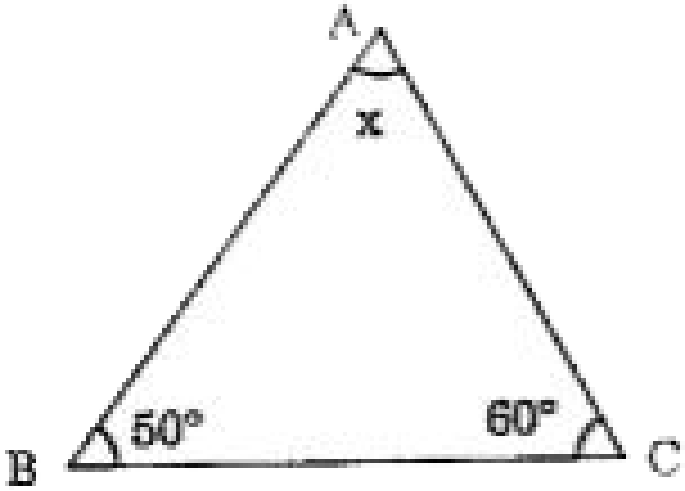
Exercise 3

1. Find the value of the unknown x in the following diagrams



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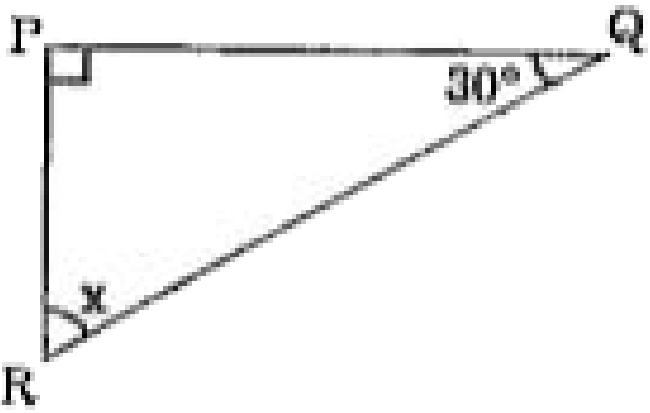
2. Find the value of the unknown x in the following diagrams



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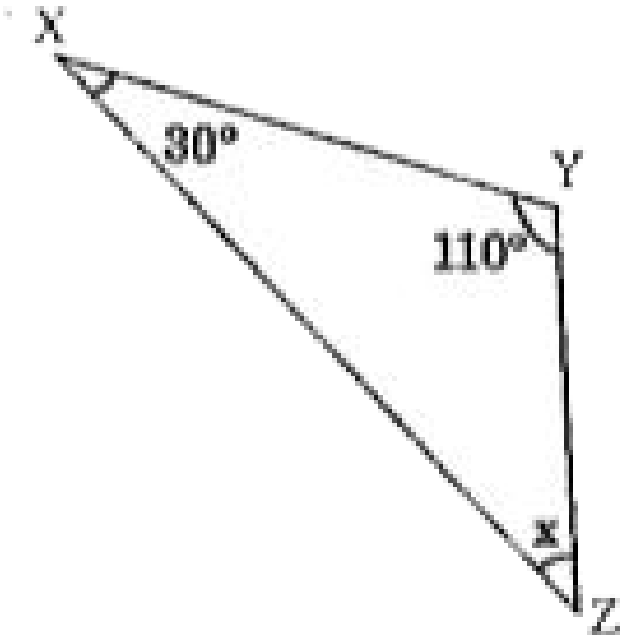
3. Find the value of the unknown x in the following diagrams



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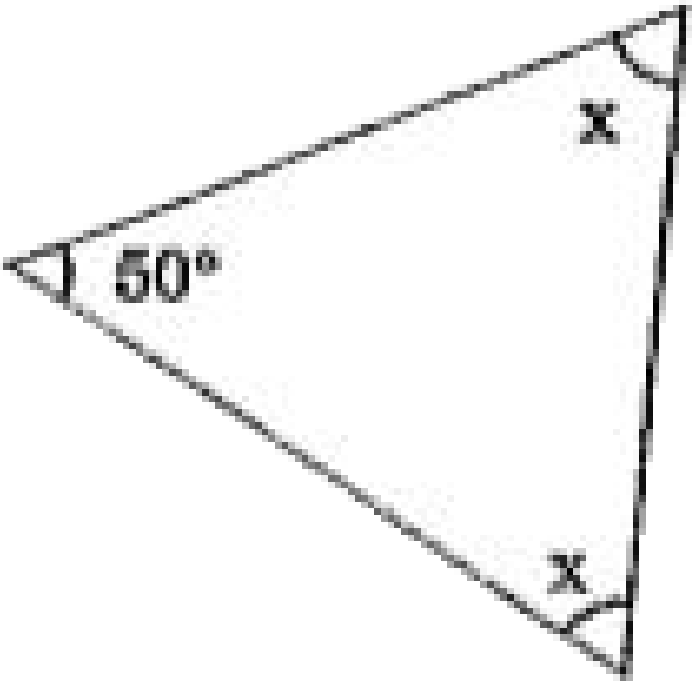
4. Find the value of the unknown x in the following diagrams



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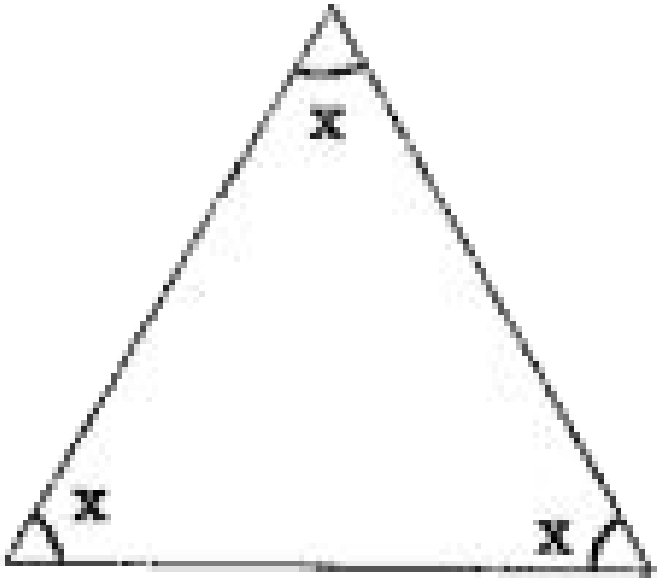
5. Find the value of the unknown x in the following diagrams



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6. Find the value of the unknown x in the following diagrams

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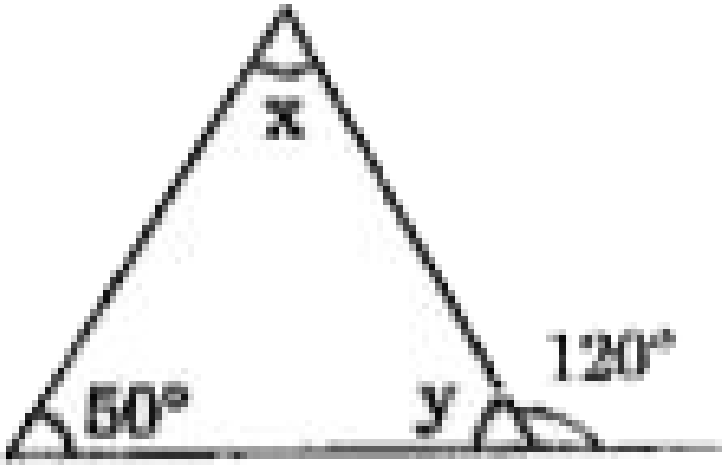
7. Find the value of unknown x and y in the following diagrams



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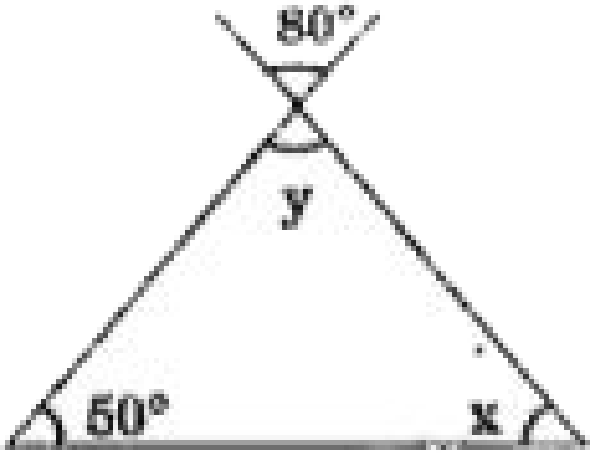
8. Find the value of unknown x and y in the following diagrams



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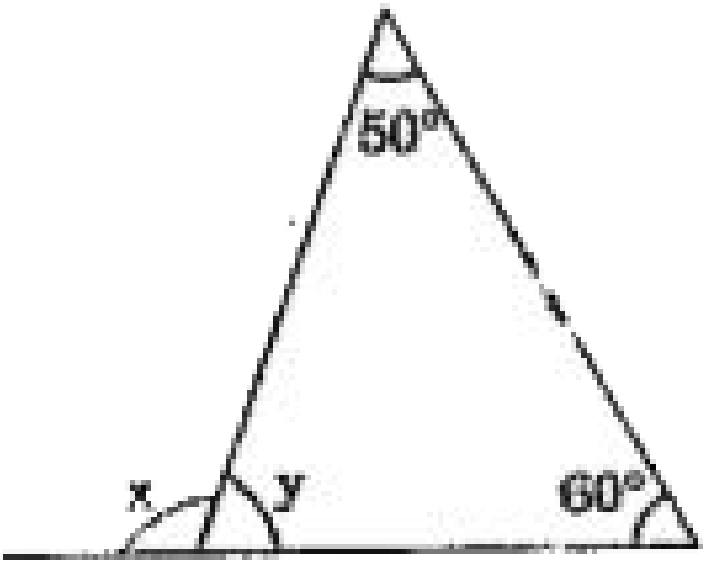

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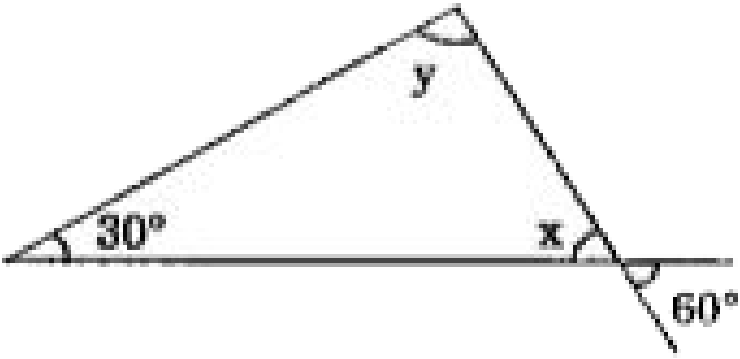
10. Find the value of unknown x and y in the following diagrams



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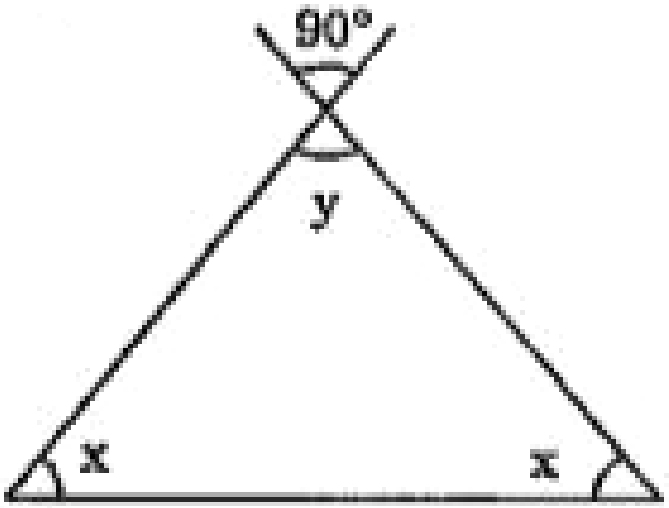
11. Find the value of unknown x and y in the following diagrams



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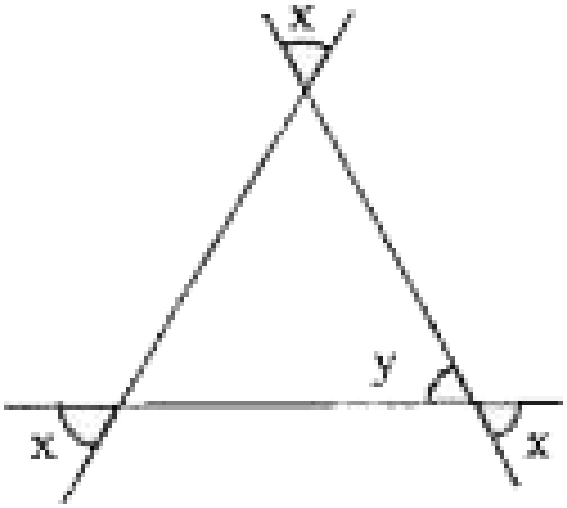
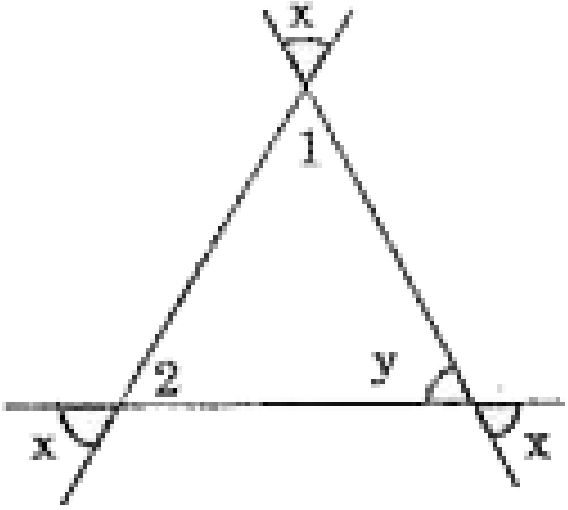
12. Find the value of unknown x and y in the following diagrams





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Exercise 4

1. Is it possible to have a triangle with the following sides?

2 cm, 3 cm, 5 cm

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2. Is it possible to have a triangle with the following sides?

3 cm, 6 cm, 7 cm

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3. Is it possible to have a triangle with the following sides?

6 cm, 3 cm, 2 cm

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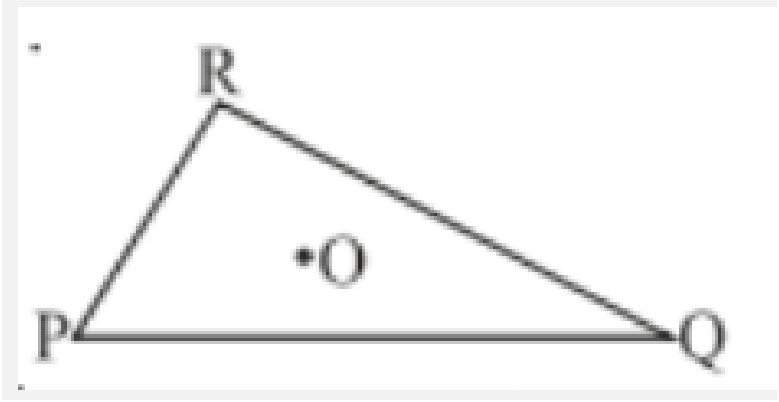
4. Take any point O in the interior of a triangle PQR. Is



OP+OQ>PQ?

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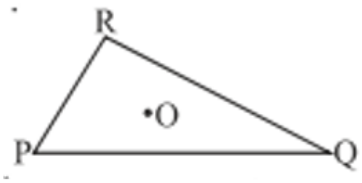
5. Take any point O in the interior of a triangle PQR. Is

OQ+OR>QR?



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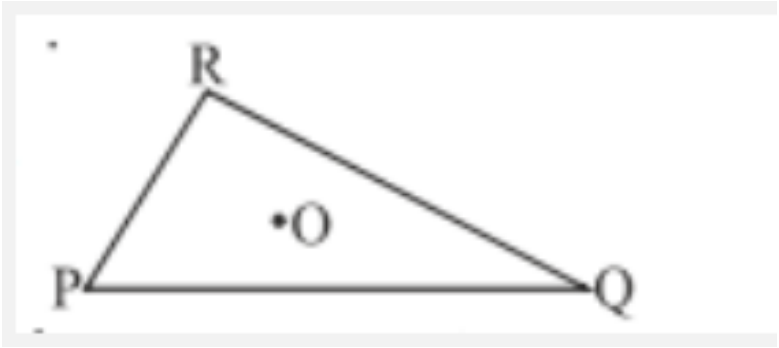
6. Take any point O in the interior of a triangle PQR. Is



OR+OP>RP?

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7. AM is a median of a triangle ABC.

Is AB+BC+CA> 2 AM? (Consider the sides of triangles $\triangle ABM$ triangleAMC`.)

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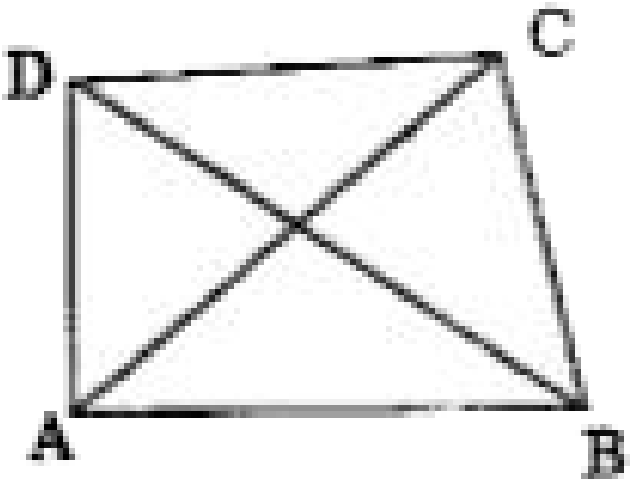
8. ABCD is a quadrilateral. Is $AB + BC + CD + DA > AC + BD$?



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9. ABCD is quadrilateral. Is

AB + BC + CD + DA < 2 (AC + BD)?

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10. The lengths of two sides of a triangle are 12 cm and 15 cm. Between what two measures should the length of the third side fall?

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Exercose 5

1. PQR is a triangle, right angled at P. If PQ= 10cm and PR= 24cm. Find QR.

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2. ABC is a triangle, right angled at C. If AB=25cm and AC=7cm. Find BC?

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3. A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance a. Find the distance of the foot of the ladder from the wall.

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4. Which of the following can be the sides of a right triangle? In case of right angled triangle, identify the right angles.

2.5cm, 6.5cm 6cm

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5. Which of the following can be the sides of a right triangle? In case of right angled triangle,

identify the right angles.

2cm, 2cm, 5cm

Watch Video Solution

6. Which of the following can be the sides of a right triangle? In case of right angled triangle, identify the right angles.

1.5cm, 2cm, 2.5cm

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7. A tree is broken at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the tree. Find the original height of the tree.

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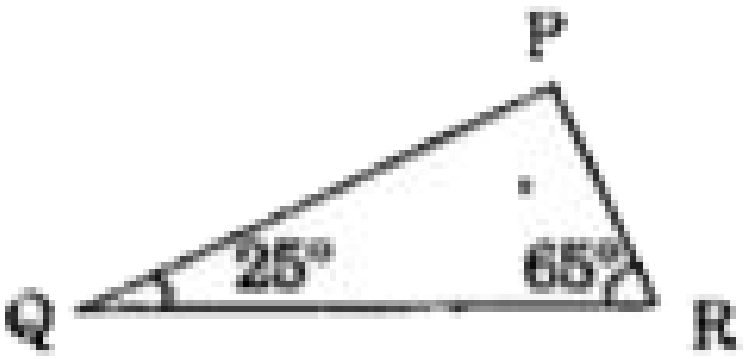
8. Angle Q and R of a ΔPQR are 25° and 65°. Write which of the following is true



(i) $PQ^3 + QR^2 = RP^2$

(ii) $PQ^2 + RP^2 = QR^2$

(iii) $RP^2 + QR^2 = PQ^2$

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9. Find the perimeter of the rectangle whose length is 40 cm and a diagonal is 41 cm.

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10. The diagonals of a rhombus measure 16 cm and 30 cm. Find its perimeter.

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Additional Questions For Practice Objective Type Questions Fill In The Blanks

1. If two angle of the triangle are $50^\circ, 70^\circ$, then the measure of the third angle is -----

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2. In ΔABC, right angled at C. If AC=8cm, BC=15cm, then length of AB= -----

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3. An isosceles right angled triangle has two acute angles, then measure of each of them is -----

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4. If a triangle holds pythagoras property, it must be a ..... Triangle

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5. If the angles of a triangle are $25^\circ, 25^\circ, 130^\circ$, then the triangle is a ..... triangle

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6. Match the following

(a)	Centroid divides each median	–	Exterior angle of the triangle
(b)	In Δ PQR, angle opposite to side QR	–	are equal to each other.
(c)	A triangle has	–	in the ratio 2: 1
(d)	Sum of two interior opposite angles	–	angle P
(e)	In isosceles triangle sides opposite to equal angles	–	Three altitudes.

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7. State whether true or false

Sum of the three exterior angles of a triangle is 180°

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8. State whether true or false

Medians of a triangle always lie in the interior of triangle.

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9. State whether true or false

A triangle can have its three angle measures as $68^\circ, 71^\circ, 39^\circ$.

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10. State whether true or false

If the angles of ΔPQR are in the ratio $1:2:3$, then the triangle formed is a scalene triangle.

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11. State whether true or false

Sum of any two sides of the triangle is less than the third side.

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Additional Questions For Practice Short Answer Type

1. Answer the following

If a, b, c are three sides of a triangle, then write three conditions of a triangle to be formed.

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2. Can the exterior angle of a triangle be a straight angle?

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3. Can you have a triangle with two right angles?

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4. Answer the following

Two diagonals of the rhombus are x and y, then what is the length of each side of the rhombus?

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5. Answer the following

The lengths of two sides of a triangle are 5cm and 9cm. Between what measures should the third side fall.

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6. If $\angle PRS = \frac{5}{9}$ of straight angle in triangle PQR. Find the measure of equal interior opposite angles.

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7. The square of the hypotenuse of right angled triangle is 72cm. If two legs of right angled triangle are equal, what is the length of each leg?

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8. The angles of a triangle are $(3x-11)^\circ, (4x-7)^\circ, 2x^\circ$. Find the

measures of angles.

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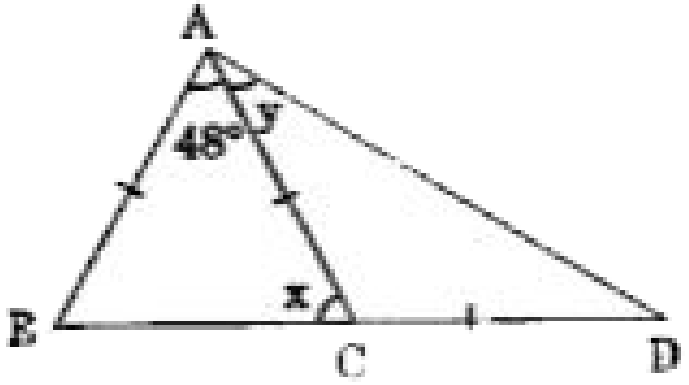
9. In the adjoining figure, find the value of x and y



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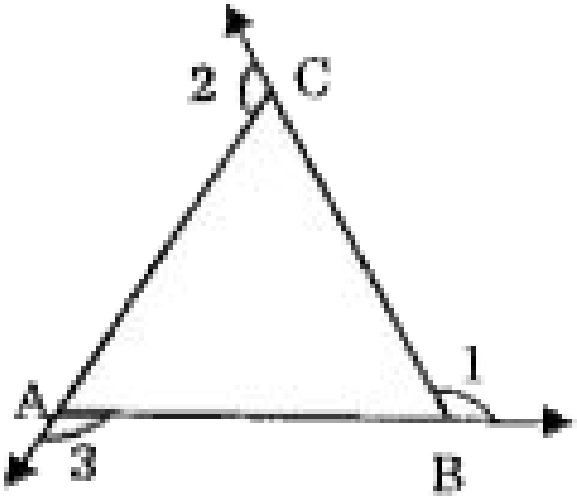
Additional Questions For Practice Long Answer Type Questions

1. The sides of the ΔABC are produced. Find the sum of the exterior angles of the triangle



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2. Find the perimeter of the shaded triangle.

Given $\angle P = \angle S = 90^\circ$

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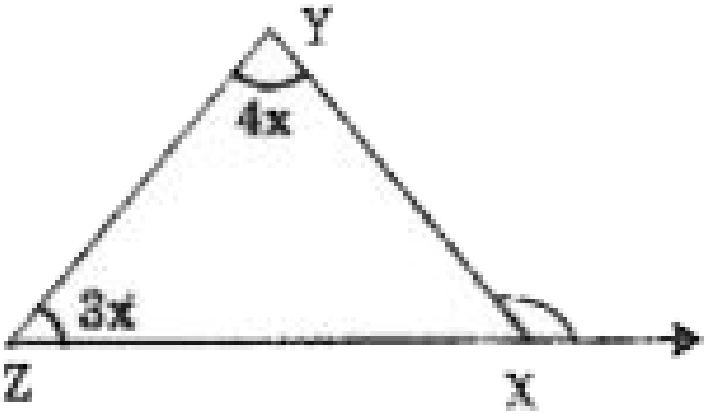
3. Find the angles of the ΔXYZ having

$3\angle Y = 4\angle Z$



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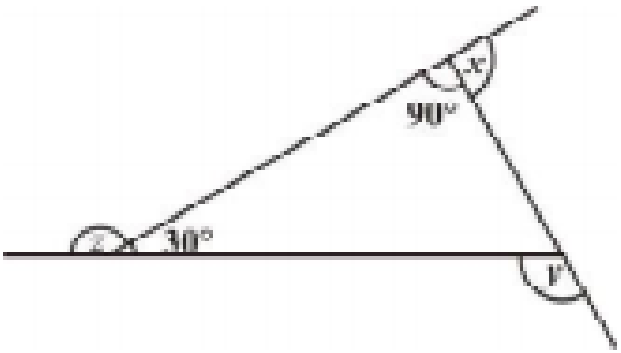
Additional Questions For Practice Hots

1. Find x+y+z



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Sample Paper For Practice Fill In The Blanks

1. Six elements of the triangle are .....and.....

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2. Polygon with minimum number of sides is.....

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3. .....is the longest side in right angled triangle

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4. Sum of the interior angles of a triangle is equal to.....

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5. .....of a triangle always intersect at a point which lies inside the triangle.

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6. If two equal sides of right angled triangle are 9cm then square of the hypotenuse is.....cm

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Sample Paper For Practice True Or False

1. Altitudes of a triangle always lie in its exterior.

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2. Can you have a triangle with all the three angles less than 60°?

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3. A median is a line segment that joins vertex and its perpendicular to the opposite side.

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4. Exterior angle of a triangle is equal to sum of any two interior angles.

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5. Side opposite to vertex L of ΔLMN is LM.

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6. Triangle is possible with length of sides 6cm, 4cm, 10cm.

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Sample Paper For Practice

1. Answer the following

If PQ= PR in ΔPQR. Write the pair of equal

angles

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2. Answer the following

Is it possible to have triangle with the measures in ΔPQR as $\angle P = 105^\circ, \angle R = 85^\circ, PQ = 5cm.$ Give reason.

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3. Answer the following

Are the number 6,8,10 form pythagorean triplet ? How?

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4. Answer the following

If one of the exterior angle of a triangle is 110°, what will be the sum of other interior opposite angles?

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5. In an isosceles triangle the base angles are 15° more than the vertical angles. Find the angles of the triangle

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6. One of the exterior angles of a triangle is 100°. The interior opposite angles are in the ratio $2:3$. Find all the angles of the triangle.

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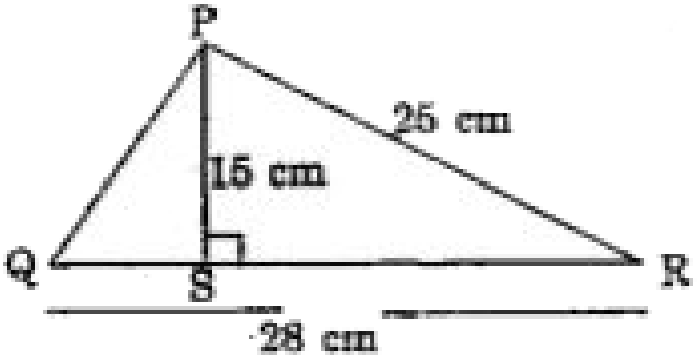
7. In the adjoining figure PS perpendicular to QR. Also, PR=25cm PS=15cm and QR=28cm. Find PQ



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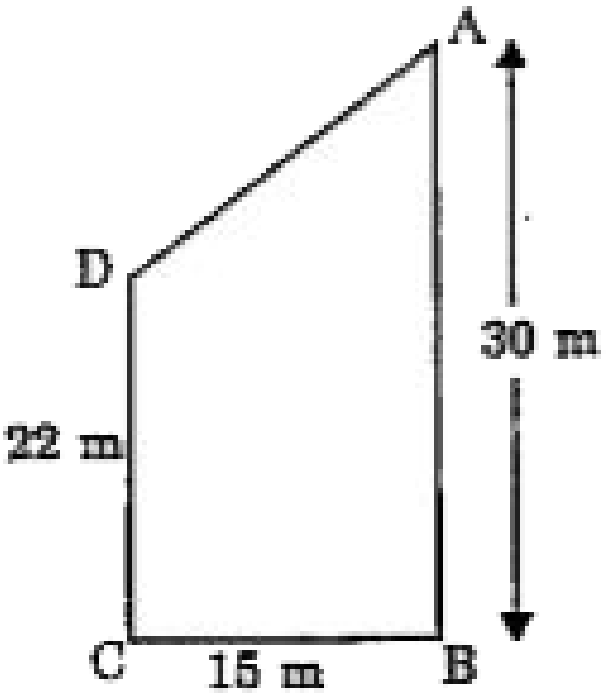
8. Two poles 22m and 30m high stand upright on a play ground. If their feet are 15m apart,

find the distance between their tops



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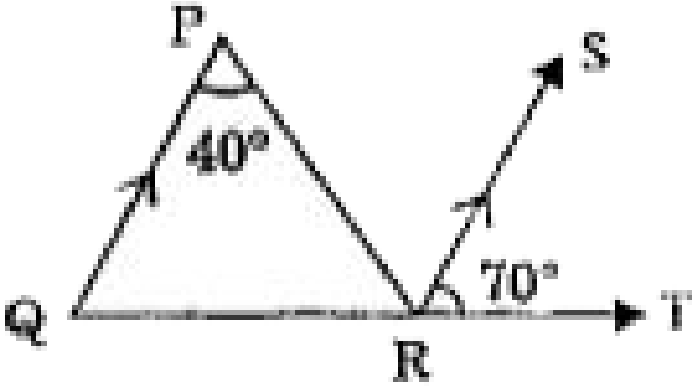
9. In

$\Delta PQR, \angle P = 40^\circ, PQ \mid \mid SR, \angle SRT = 70^\circ$

, then find $\angle PQR$ and $\angle PRQ$



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