MATHS

NCERT - NCERT Maths(TELUGU)

TRIANGLE AND ITS PROPERTIES

Example

1. In $\triangle ABC, \angle A = 30^\circ, \angle B = 45^\circ$ find $\angle C$

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2. In $\triangle ABC$, if $\angle A = 3\angle B$ and $\angle C = 2\angle B$. Find all the three angles of $\triangle ABC$.

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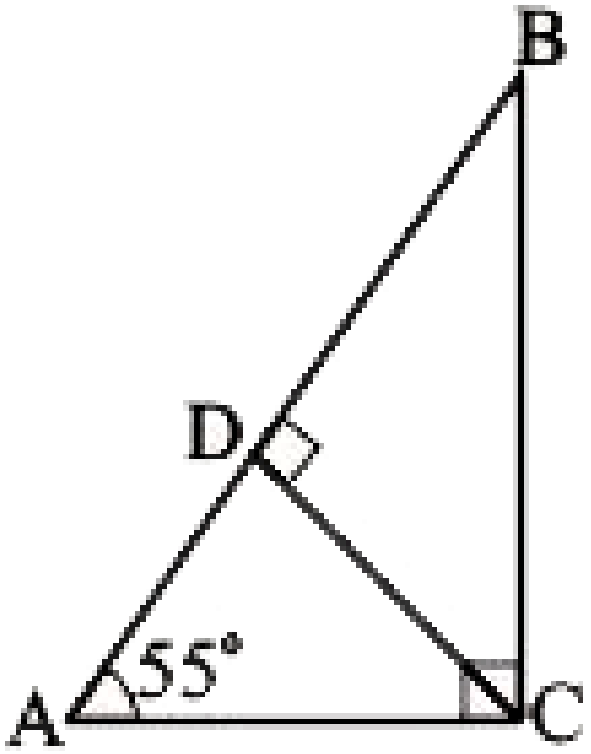
3. $\triangle ABC$ is right angled at C and $CD \perp AB$, $\angle A = 55^\circ$, $\angle ACD$=



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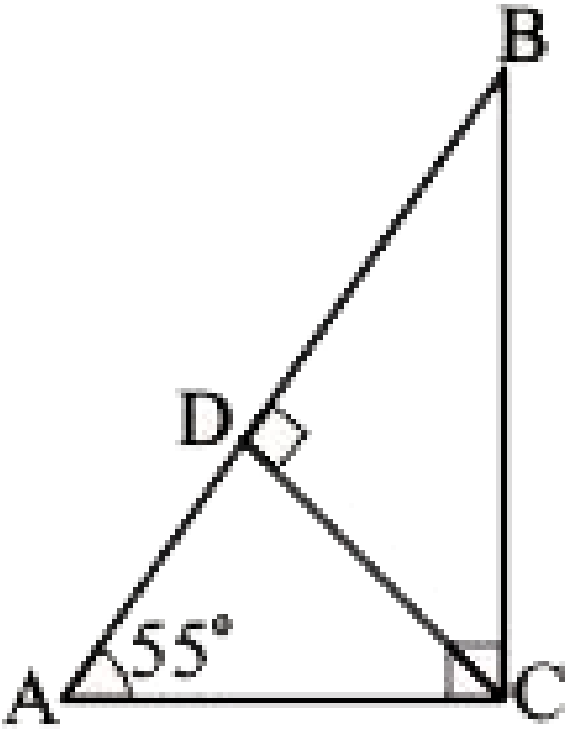
4. $\triangle ABC$ is right angled at C and $CD \perp AB, \angle A = 55^\circ$ $\angle BCD =$



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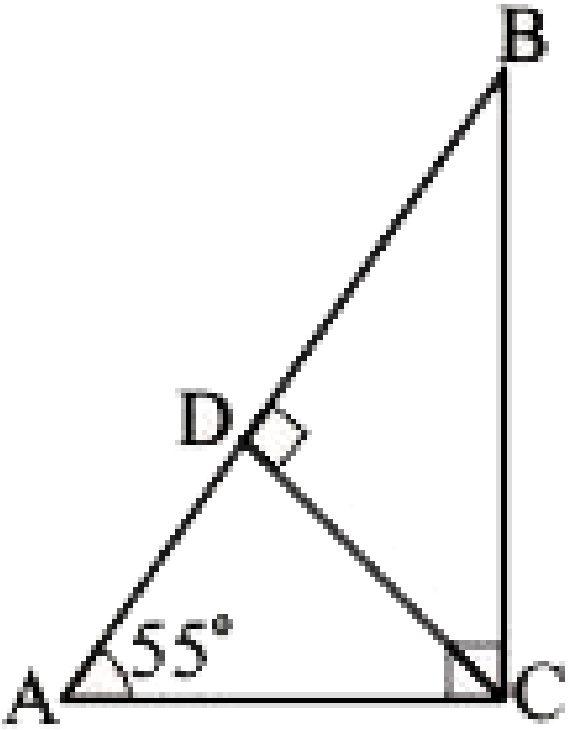

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6. The angles of a triangle are in the ratio 2: 3:4. Find the angles.

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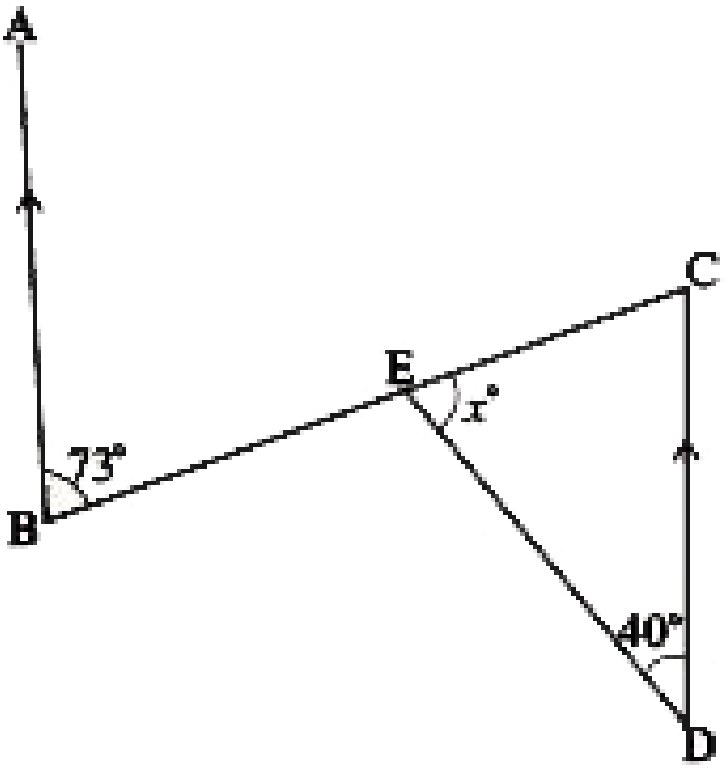
7. Find the value of angle 'x' in the figure. $\overline{AB} \parallel \overline{CD}$



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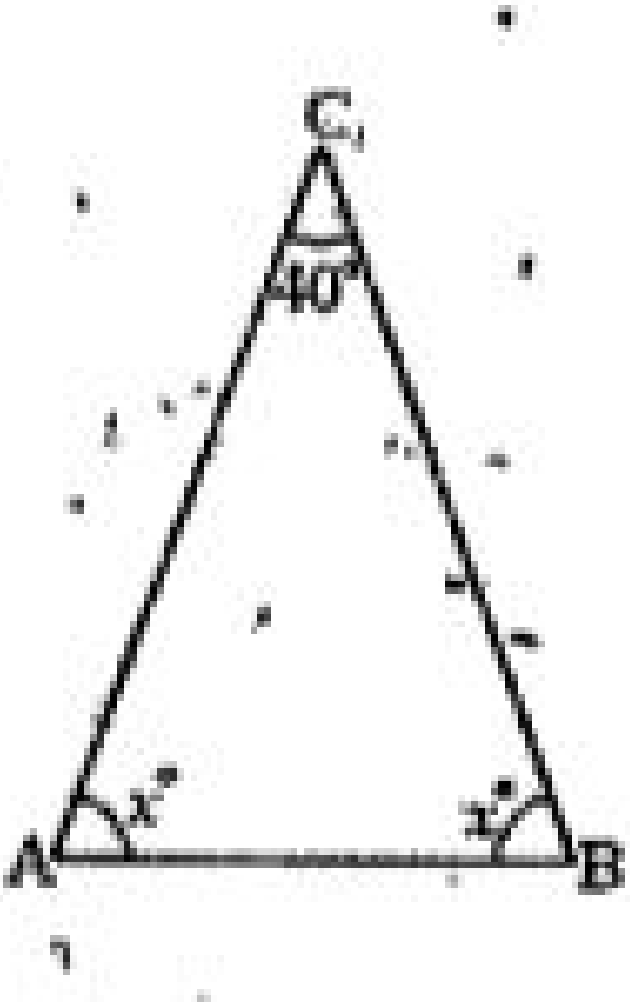
8. One angle of $\triangle ABC$ is 40° and the other two angles are equal. Find the measure(value) of each Equal angle.



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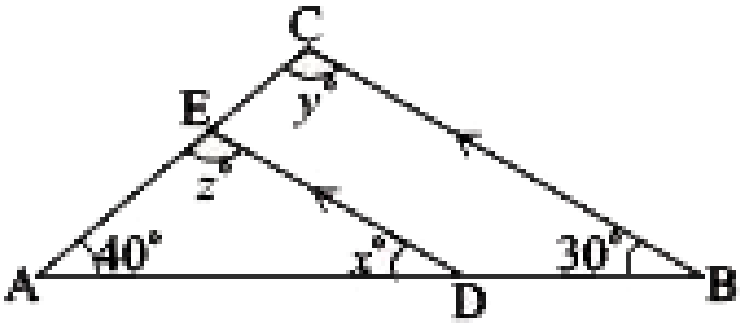
9. In the figure, D and E are the points on sides AB and AC of $\triangle ABC$ such that $DE \| BC$. if $\angle B = 30^\circ$ and $\angle A = 40^\circ$, find (i) x (ii) y (iii) z



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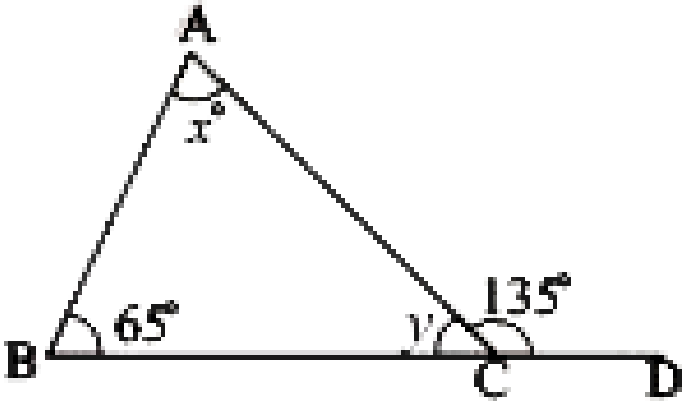
10. In the figure, find the value x and y.



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11. One of the exterior angles of a triangle is 120° and the Interior opposite angles are in the ratio 1:5. Find the angles of the triangle.

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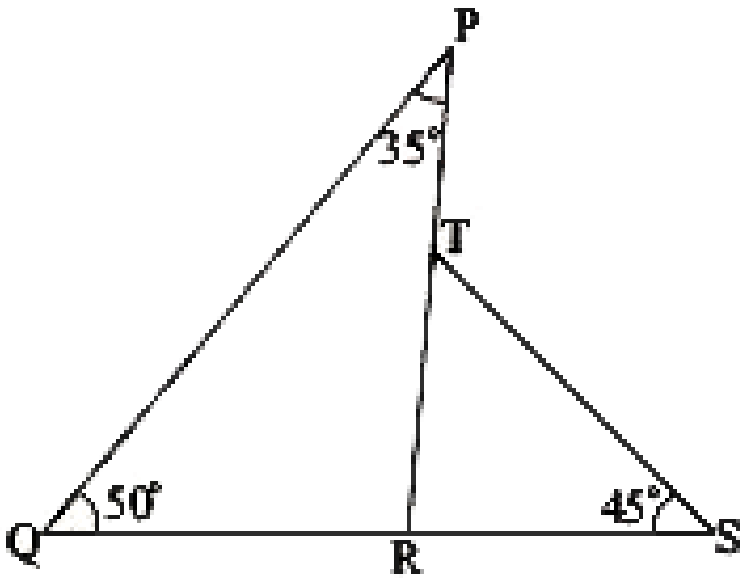
12. In the adjacent figure, find

(i) $\angle PRS$ (ii) $\angle PTS$ (iii) $\angle STR$ (iv) $\angle PRQ$



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13. Show that the sum of the exterior angles of $\triangle ABC$ is 360°

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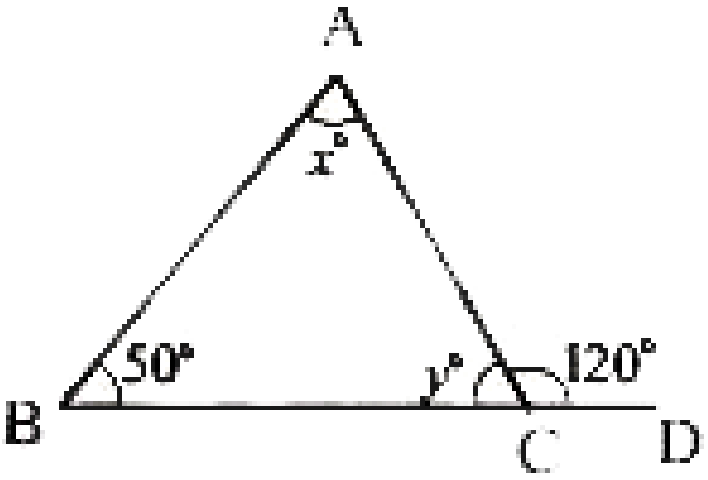
14. Find the angles x and y in the following figures.



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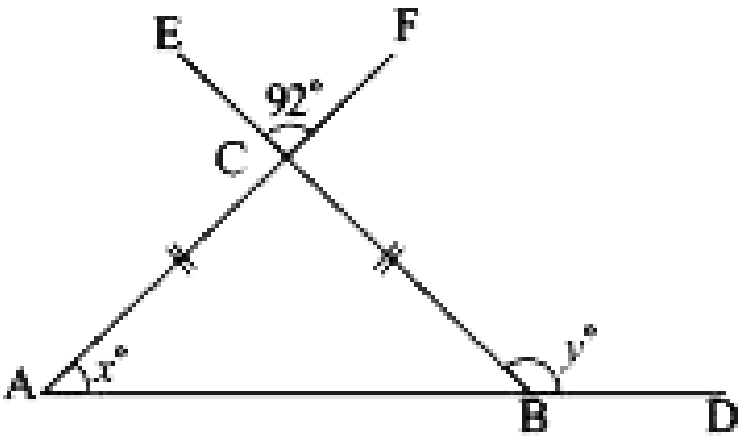

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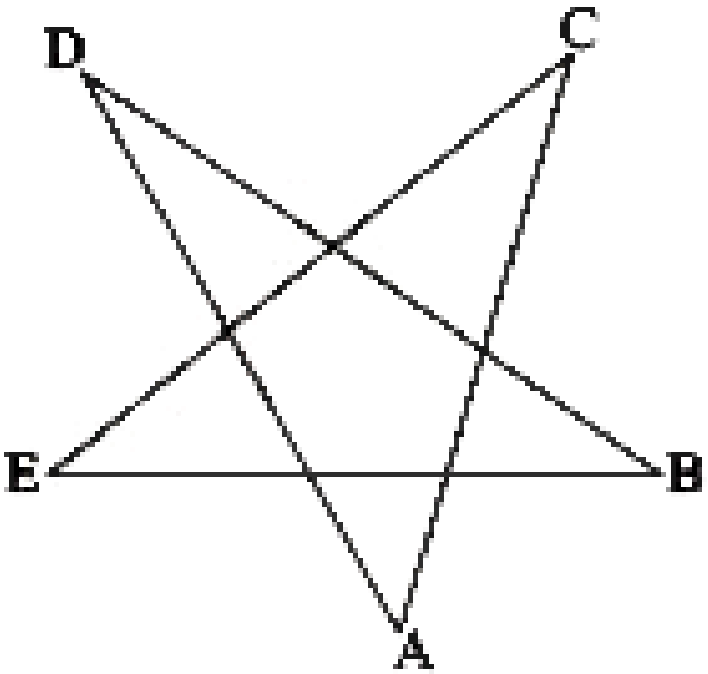
16. Find the value of $\angle A + \angle B + \angle C + \angle D$ of the following figure



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17. Can a triangle have sides with lengths 6 cm, 5 cm and 8 cm?

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18. In $\triangle ABC, \angle A = 30^\circ, \angle B = 45^\circ$ find $\angle C$

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19. In $\triangle ABC$, if $\angle A = 3\angle B$ and $\angle C = 2\angle B$. Find all the three angles of $\triangle ABC$.

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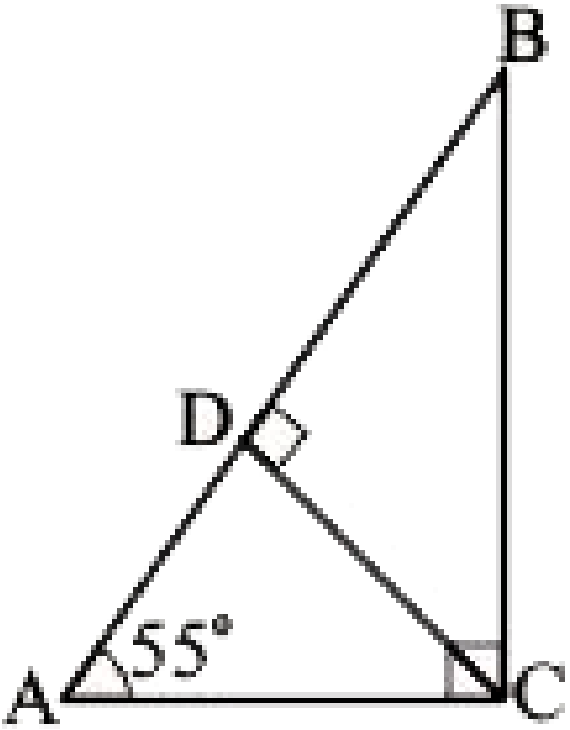

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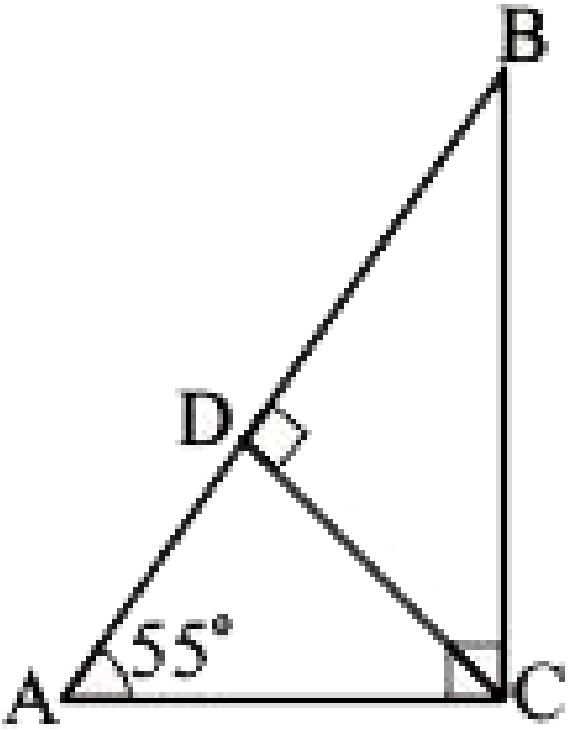
21. $\triangle ABC$ is right angled at C and $CD \perp AB, \angle A = 55^\circ$ $\angle BCD =$



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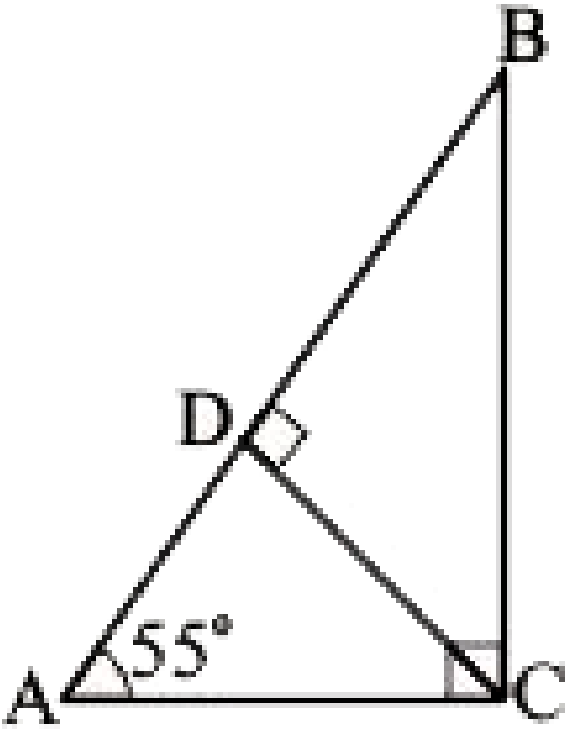
22. $\triangle ABC$ is right angled at C and $CD \perp AB, \angle A = 55^\circ$ $\angle BCD =$



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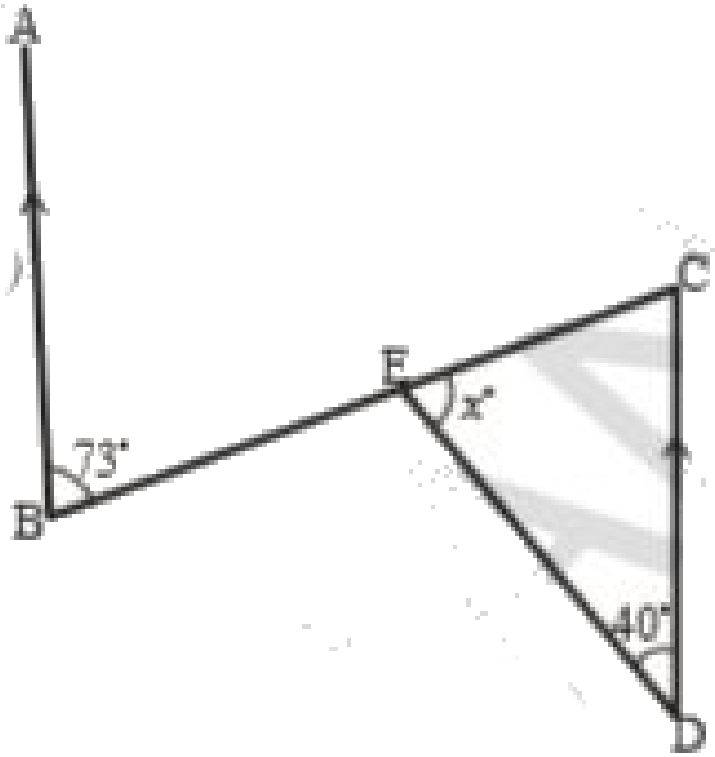
24. Find the value of angle ‘x’ in the figure.



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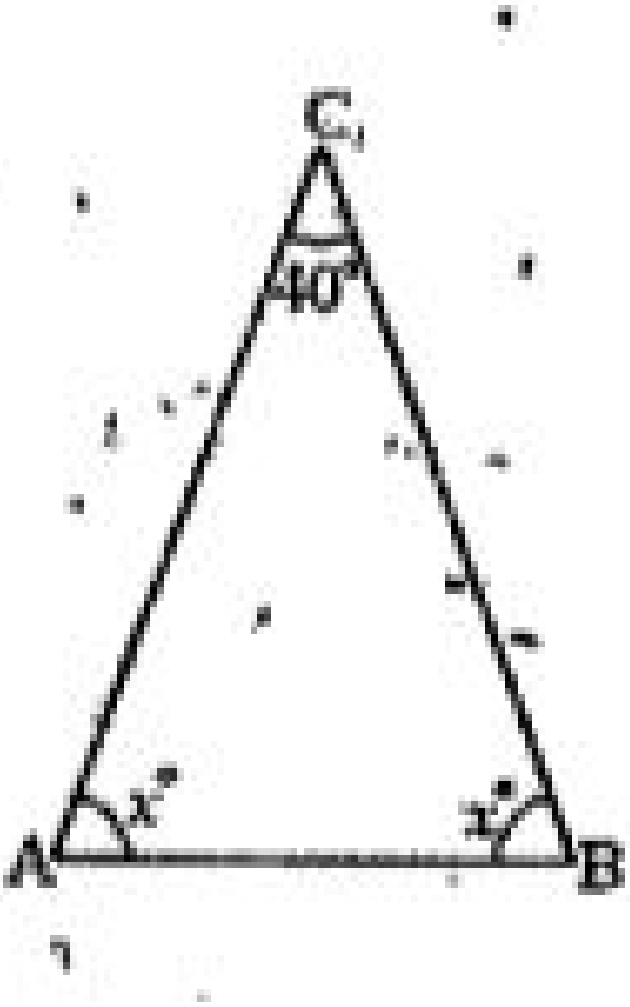

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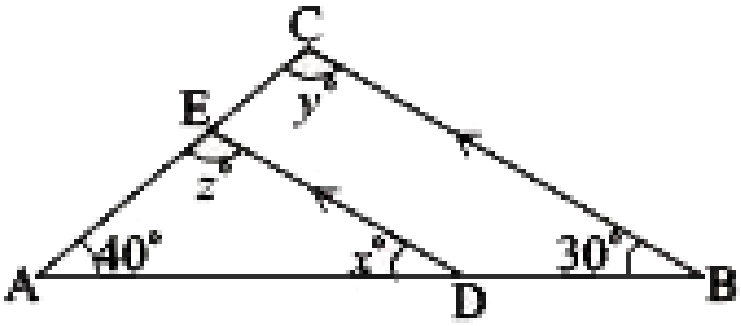

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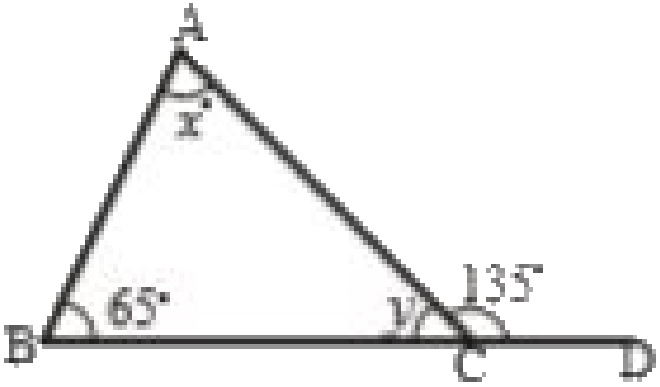
27. In the figure, find the values of x and y.



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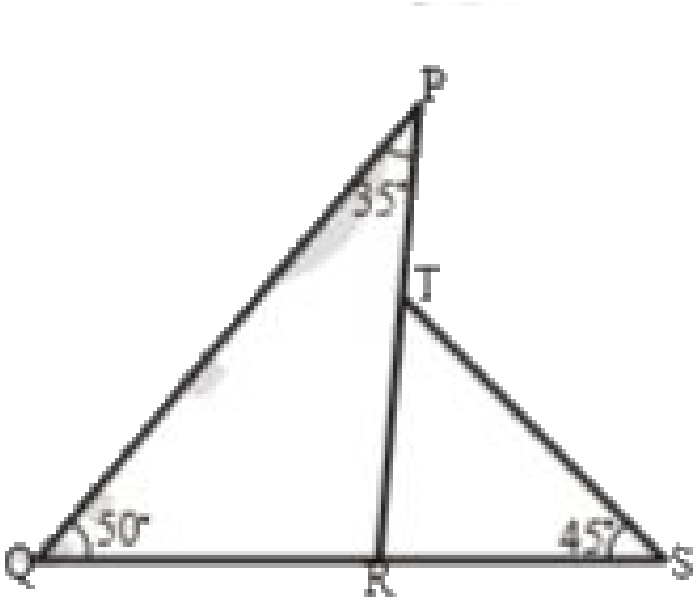
29. In the adjacent figure, find



$\angle PRS$

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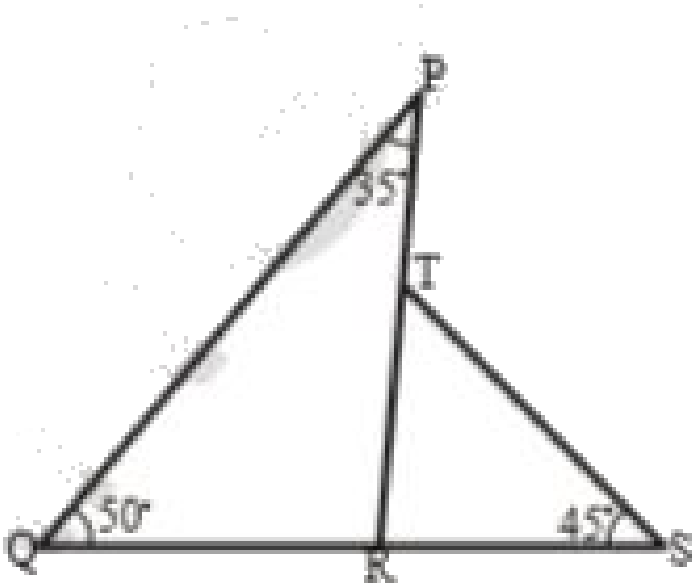
30. In the adjacent figure, find



$\angle PTS$

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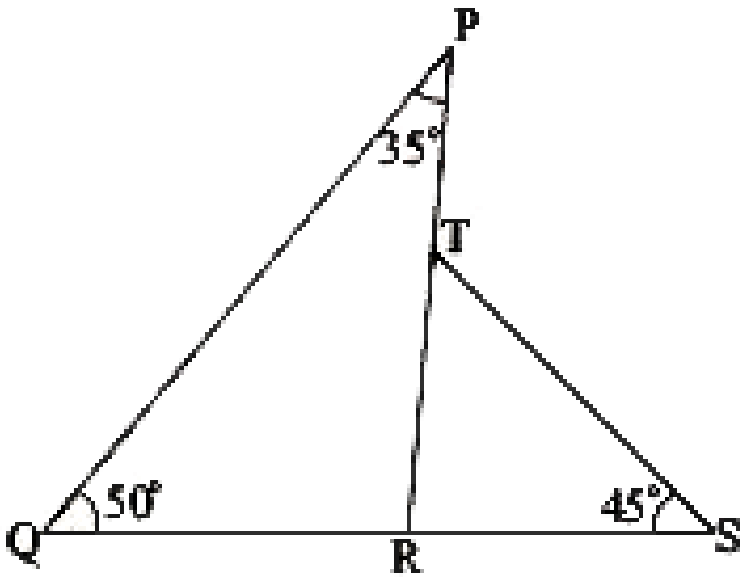
31. In the adjacent figure, find

(i) $\angle PRS$ (ii) $\angle PTS$ (iii) $\angle STR$ (iv) $\angle PRQ$



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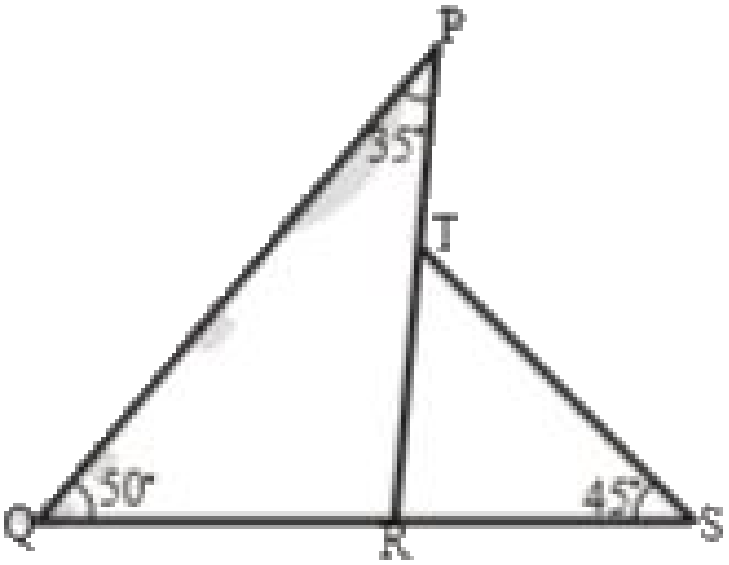
32. In the adjacent figure, find



$\angle PRQ$

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33. Show that the sum of the exterior angles of $\triangle ABC$ is 360°

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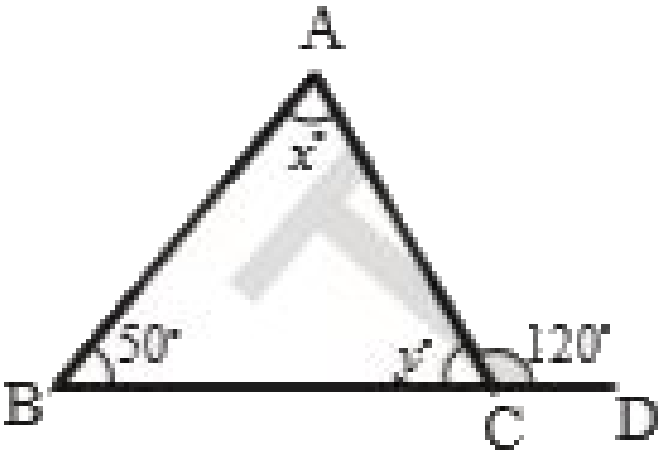
34. Find the angles x and y in the following figure.



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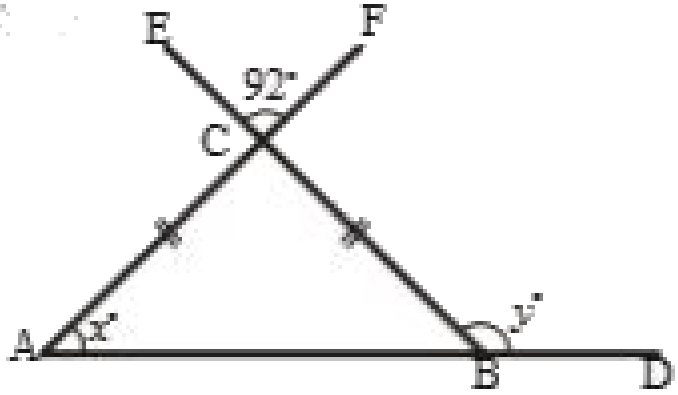
35. Find the angles x and y in the following figure.



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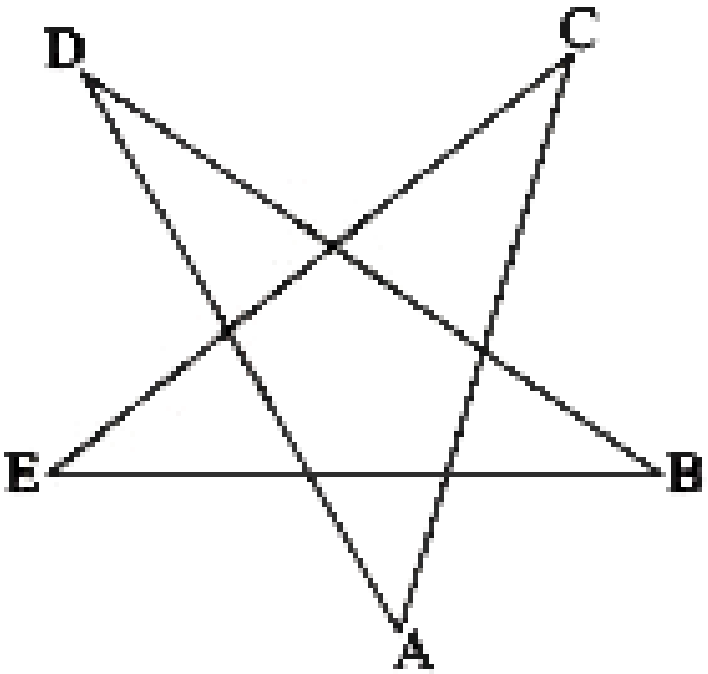
36. Find the value of $\angle A + \angle B + \angle C + \angle D$ of the following figure



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Try This

1. Uma felt that a triangle can be formed with three collinear points. Do you agree? Why? Draw diagrams

to justify your answer. [If three or more points lie on the same line, then they are called collinear points]

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2. Make paper-cut models of the various types of triangles discussed above Compare your models With those of your friends.

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3. Rashmi claims that no triangle can have more than one right angle. Do you agree with her. Why?

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4. Kamal claims that no triangle can have more than two acute angles. Do you agree with him. Why?

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5. The lengths of two sides of a triangle are 6 cm and 9 cm. Write all the possible lengths of the Third side.

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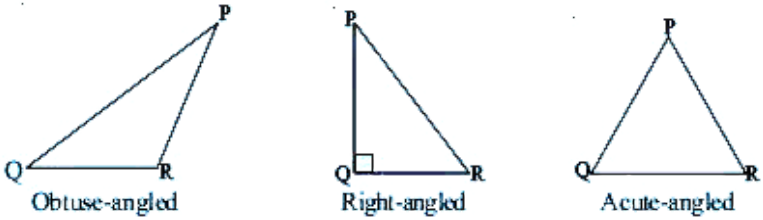
6. Draw altitudes from P to $\overline{QR}$ for the following triangles.



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7. Will an altitude always lie in the interior of a triangle?

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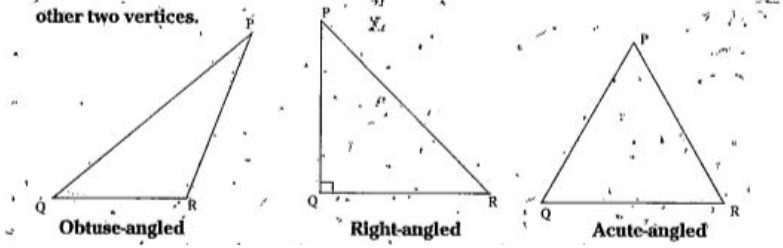
8. Can you think of a triangle in which the two altitudes of a triangle are two of its'sides?

other two vertices.



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9. Take paper cut outs of right-angled triangles and obtuse-angled triangles and find their centroid.

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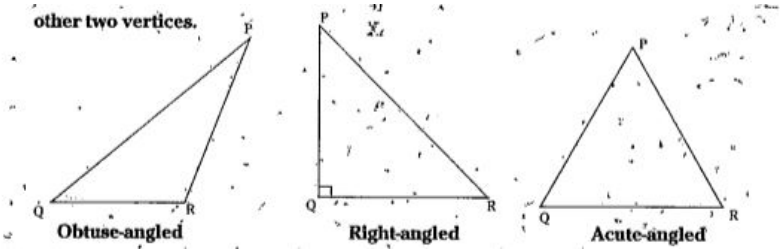

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15. Take paper cut outs of right-angled triangles and obtuse-angled triangles and find their centroid.

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16. Uma felt that a triangle can be formed with three collinear points. Do you agree? Why? Draw diagrams to justify your answer. [If three or more points lie on the same line, then they are called collinear points]

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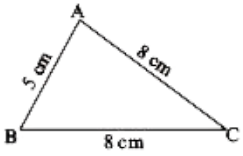
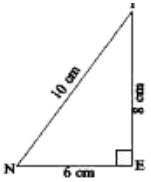
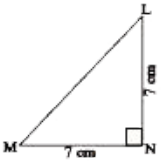
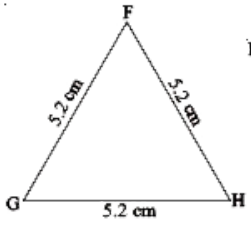
Do This

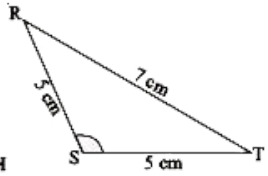
1. Classify the following triangles according to their (i) sides and (ii) angles.

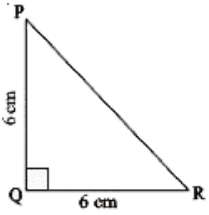












(2) Write the six elements (i.e. the 3 sides and 3 angles) of $\triangle ABC$.

(3) Write the side opposite to vertex Q in $\triangle PQR$.

(4) Write the angle opposite to side $\overline{LM}$ in $\triangle LMN$.

(5) Write the vertex opposite to side $\overline{RT}$ in $\triangle RST$.

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2. Draw $\triangle ABC$ and form an exterior $\angle ACD$ Now take a protractor and measure $\angle ACD, \angle A$ and $\angle B$. Find the sum $\angle A + \angle B$ and compare it with the measure$\angle ACD$.Do you observe that$\angle ACD$ is equal (or nearly equal) to $\angle A + \angle B$

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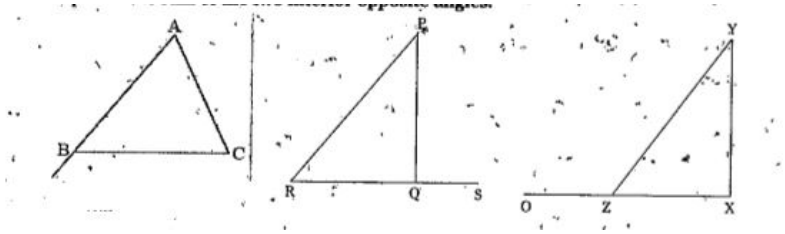
5. Copy each of the following triangles. In each case verify that an exterior angle of a triangle is equal to

the sum of the two interior opposite angles:



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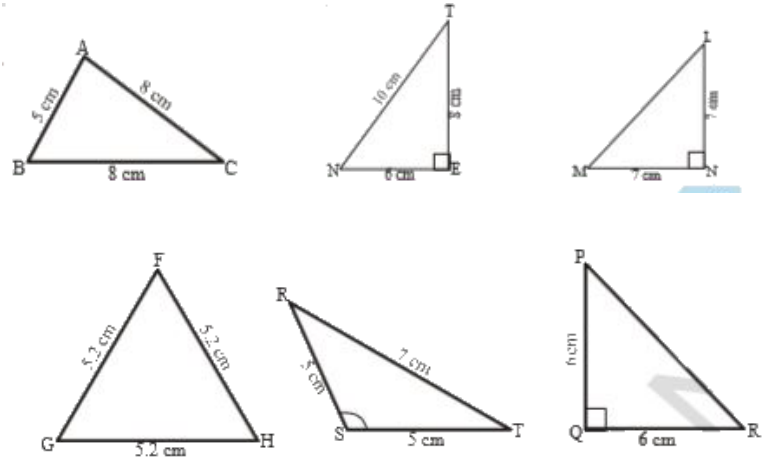

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angles) of ΔABC.

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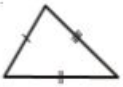
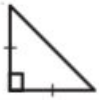
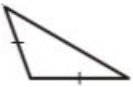
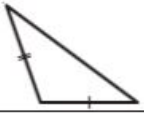
(4) Write the angle opposite to side $\overline{LM}$ in ΔLMN.

(5) Write the vertex opposite to side $\overline{RT}$ in ΔRST.

If we consider triangles in terms of both sides and angles we can have the following types of triangles:

Type of Triangle	Equilaterial	Isosceles	Scalene
Acute-angled			
Right-angled			
Obtuse-angled			

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7. Draw $\triangle ABC$ and form an exterior $\angle ACD$ Now take a protractor and measure $\angle ACD, \angle A$ and $\angle B$. Find the sum $\angle A + \angle B$ and compare it with the measure$\angle ACD$.Do you observe that$\angle ACD$ is equal (or nearly equal) to $\angle A + \angle B$

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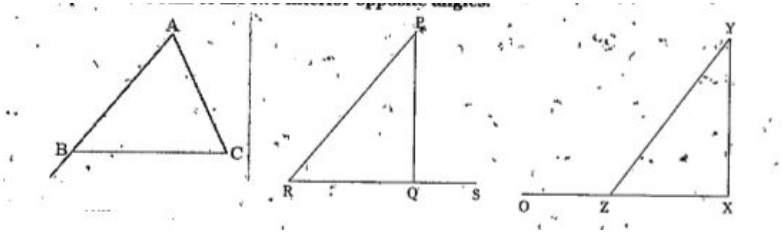
8. Copy each of the following triangles. In each case verify that an exterior angle of a triangle is equal to the sum of the two interior opposite angles:



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Exerciese 1

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

3 cm, 4 cm and 6 cm.

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2. Is it possible to have a triangle with the following sides?6 cm, 6 cm and 6 cm

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3. Is it possible to have a triangle with the following sides? 4 cm, 4 cm and 8 cm.

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4. Is it possible to have a triangle with the following sides?3 cm, 5 cm and 7 cm

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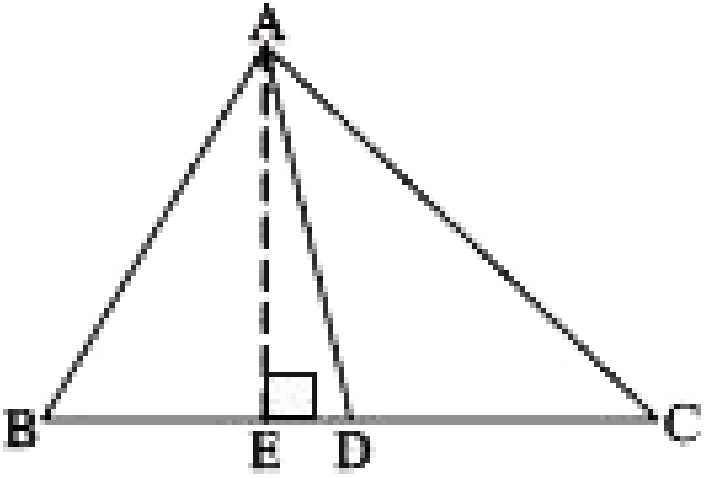
Exercise 2

1. In $\triangle ABC$, D is the midpoint of $\overline{BC}$

(i) $\overline{AD}$ is the ____

(ii) $\overline{AE}$ is the _____



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2. Name the triangle in which two altitudes of the triangle are two of its sides.

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3. Does a median always lie in the interior of the triangle ?

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4. Does an altitude always lie in the interior of a triangle?

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5. Write the side opposite to vertex Y in $\triangle XYZ$

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6. Write the angle opposite to side $\overline{PQ}$ in $\triangle PQR$

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7. Write the vertex opposite to side $\overline{AC}$ in $\triangle ABC$

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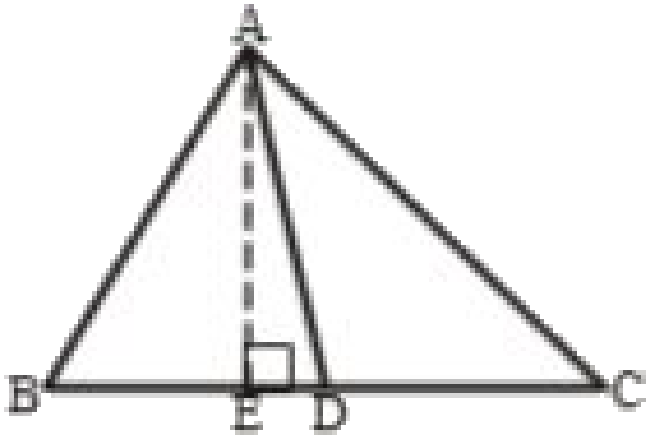
8. In ΔABC, D is the midpoint of $\overline{BC}$.



$\overline{AD}$ is the _____

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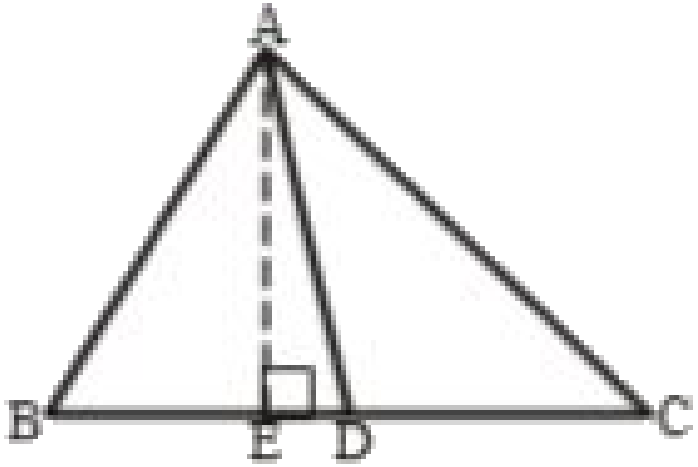
9. In ΔABC, D is the midpoint of $\overline{BC}$.



$\overline{AE}$ is the _____

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10. Name the triangle in which two altitudes of the triangle are two of its sides.

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11. Does a median always lie in the interior of the triangle ?

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12. Does an altitude always lie in the interior of a triangle?

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13. Write the side opposite to vertex Y in $\triangle XYZ$

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14. Write the angle opposite to side $\overline{PQ}$ in $\triangle PQR$

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15. Write the vertex opposite to side $\overline{AC}$ in $\triangle ABC$

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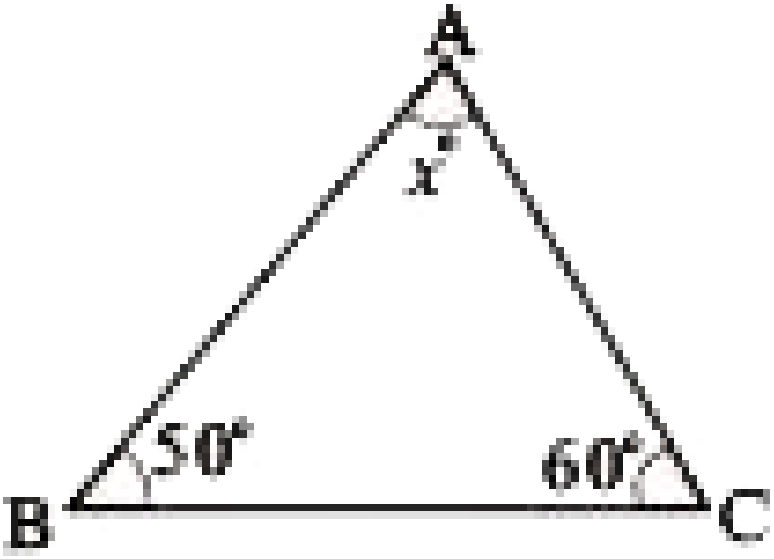
Exercise 3

1. Find the value of the unknown 'x' in the following triangles.



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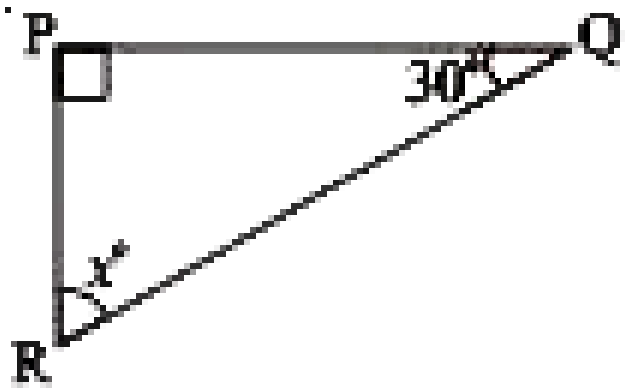
2. Find the value of the unknown ‘x’ in the following triangles.



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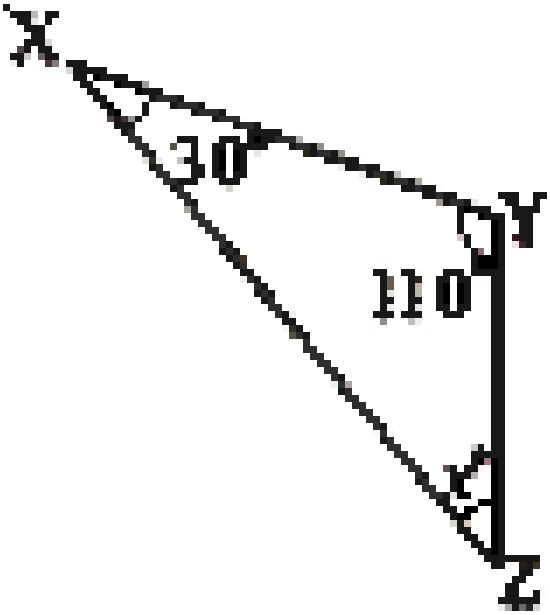
3. Find the value of the unknown ‘x’ in the following triangles.



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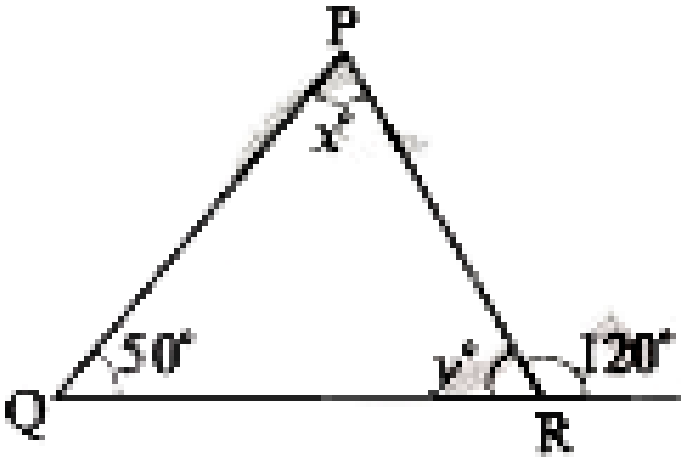
4. Find the values of the unknowns ‘x’ and ‘y’ in the following diagrams.



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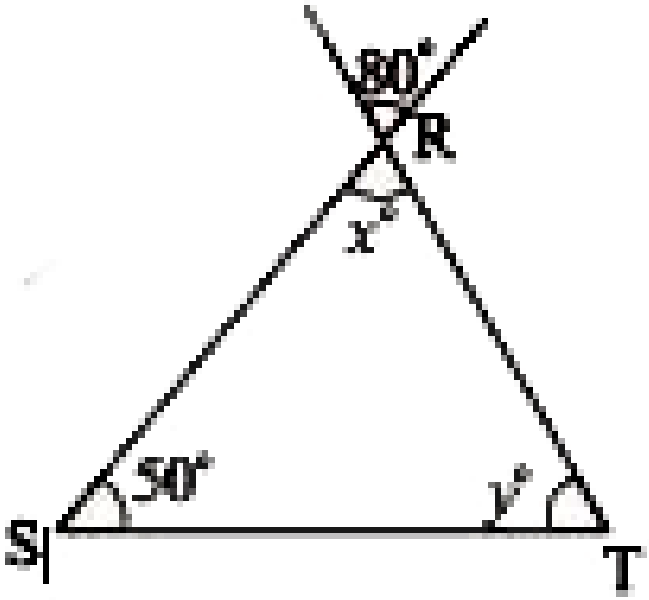
5. Find the values of the unknowns ‘x’ and ‘y’ in the following diagrams.



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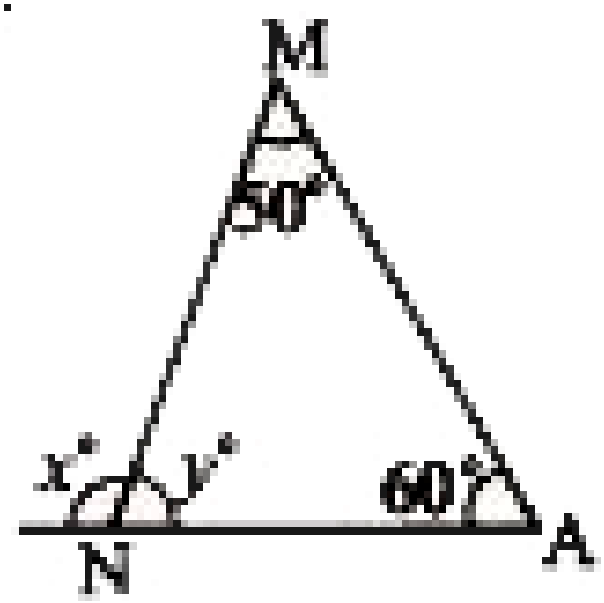
6. Find the values of the unknowns ‘x’ and ‘y’ in the following diagrams.



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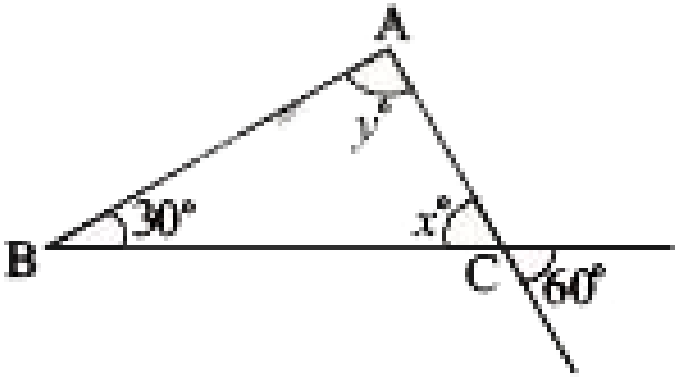
7. Find the values of the unknowns ‘x’ and ‘y’ in the following diagrams.



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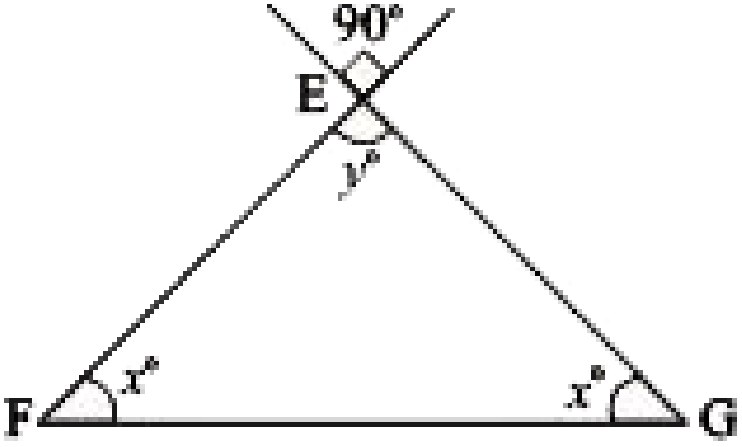
8. Find the values of the unknowns ‘x’ and ‘y’ in the following diagrams.



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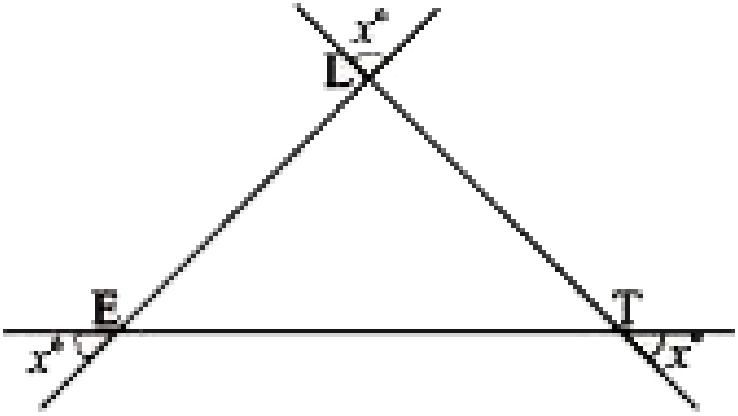
9. Find the values of the unknowns ‘x’ in the following diagrams.



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10. Find the measure of the third angle of triangles whose two angles are given below. 38° , 102°

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11. Find the measure of the third angle of triangles whose two angles are given below. 116°, 30°

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12. Find the measure of the third angle of triangles whose two angles are given below. 40°, 80°

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13. In a right angled triangle, one acute angle is 30° find the other acute angle

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14. State true or false for each of the following statements: A triangle can have two right angles.

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15. State true or false for each of the following statements: A triangle can have two acute angles.

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16. State true or false for each of the following statements: A triangle can have two obtuse angles.

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17. State true or false for each of the following statements: Each angle of a triangle can be less than 60°

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18. The angles of a triangle are in the ratio 1 : 2 : 3.

Find the angles.

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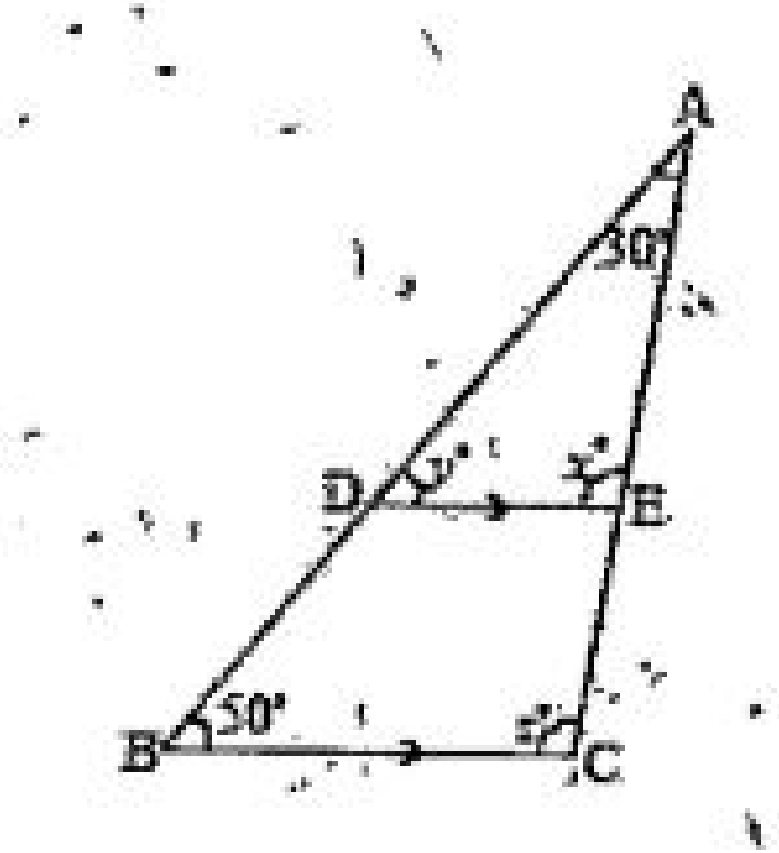
19. In the figure, $\overline{DE} \parallel \overline{BC}, \angle A = 30^\circ, \angle B = 50^\circ$

Find the values of x,y and z.



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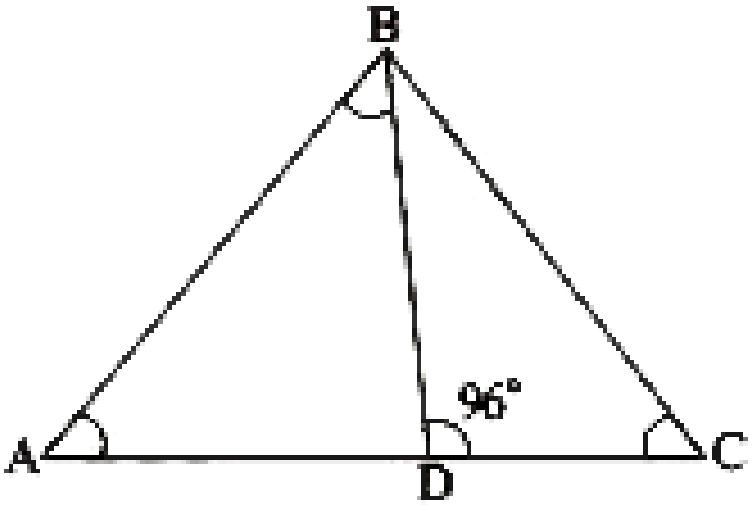
20. In the figure, $\angle ABD = 3\angle DAB$ and $\angle BDC = 96^\circ$. Find

$\angle ABD$



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21. In $\triangle PQR, \angle P = 2\angle Q$ and $2\angle R = 3\angle Q$ calculate the angles of $\triangle PQR$

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22. If the angles of a triangle are in the ratio 1: 4:5, find the angles.

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23. The acute angles of a right triangle are in the ratio 2 : 3. Find the angles of the triangle.

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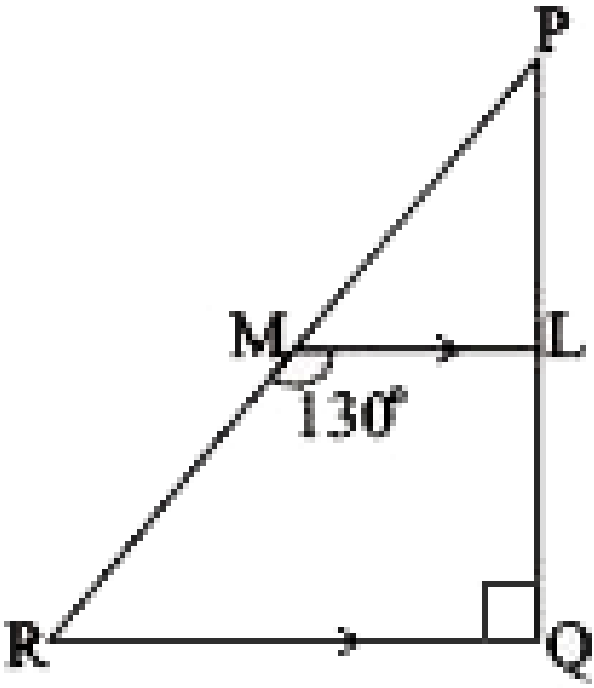
24. In the figure, $\triangle PQR$ is right angled at $\overline{ML} \mid\mid \overline{RQ}$ and $\angle LMR = 130^\circ$. Find

$\angle LPM, \angle PML$ and $\angle PRQ$.



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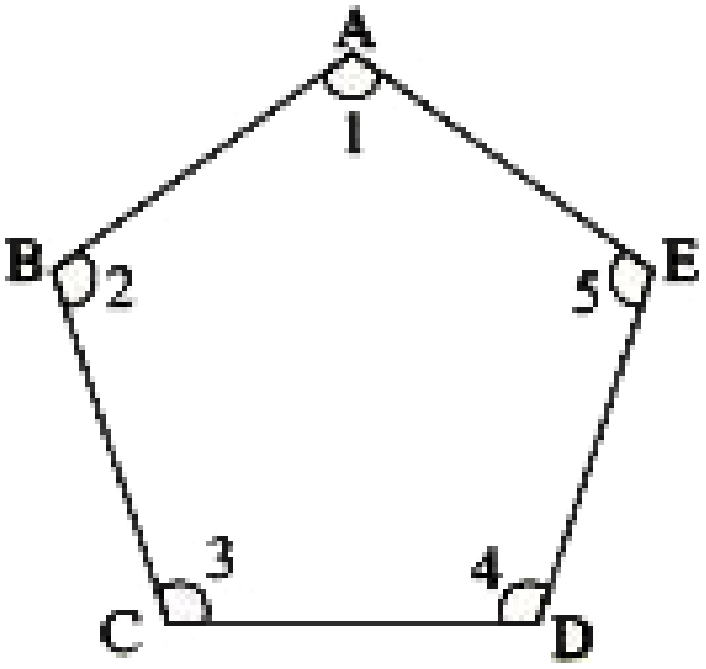
25. In Figure $ABCDE$, find

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5$.



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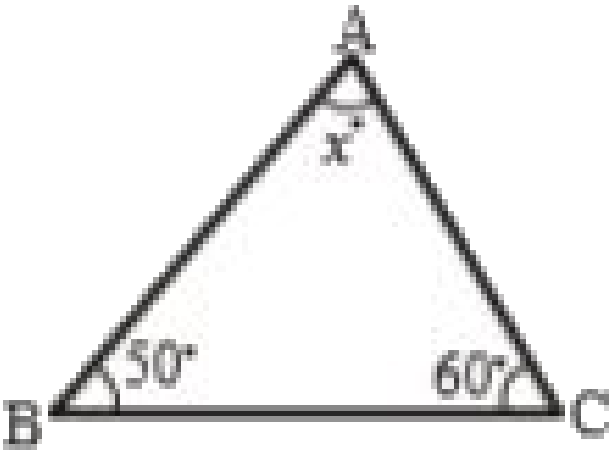
26. Find the value of the unknown 'x' in the following triangles.



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27. Find the value of the unknown 'x' in the following triangles.

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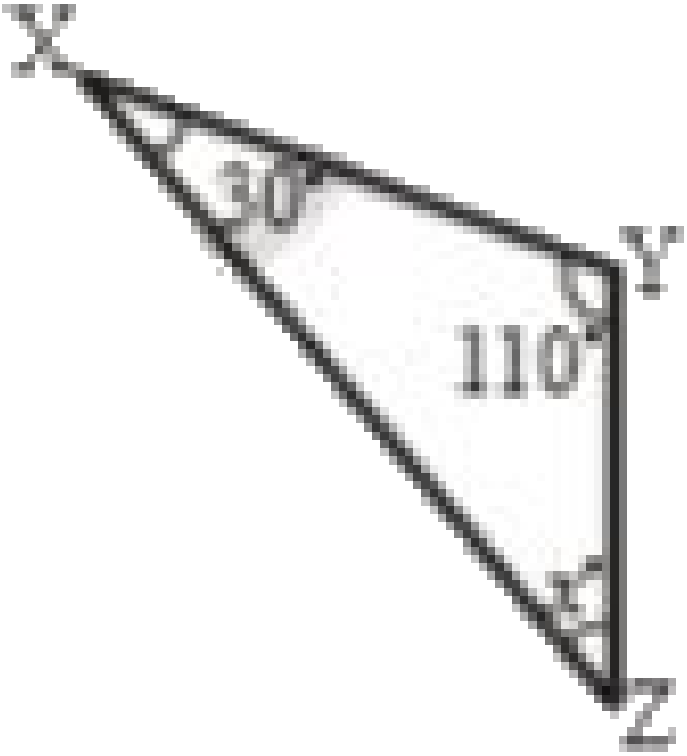
28. Find the value of the unknown 'x' in the following triangles.



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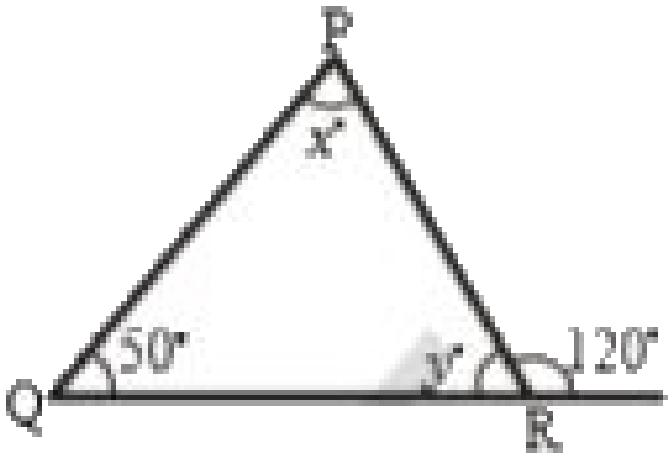
29. Find the values of unknows 'x' and 'y' in the following diagrams.



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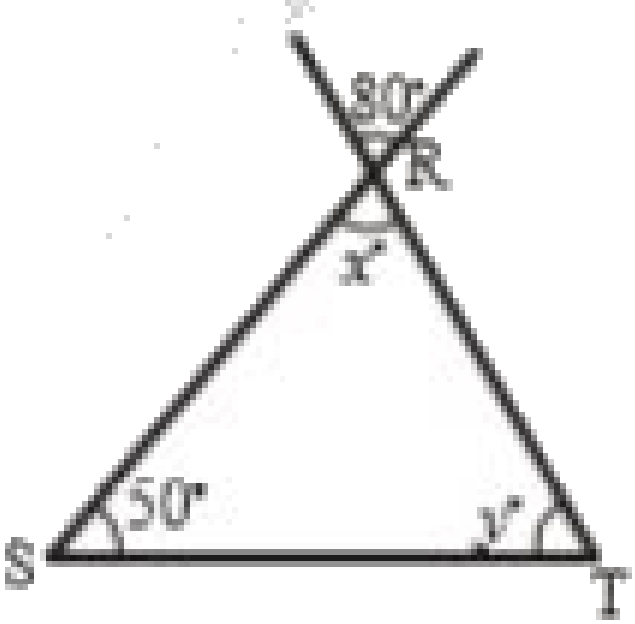
30. Find the values of unknows 'x' and 'y' in the following diagrams.



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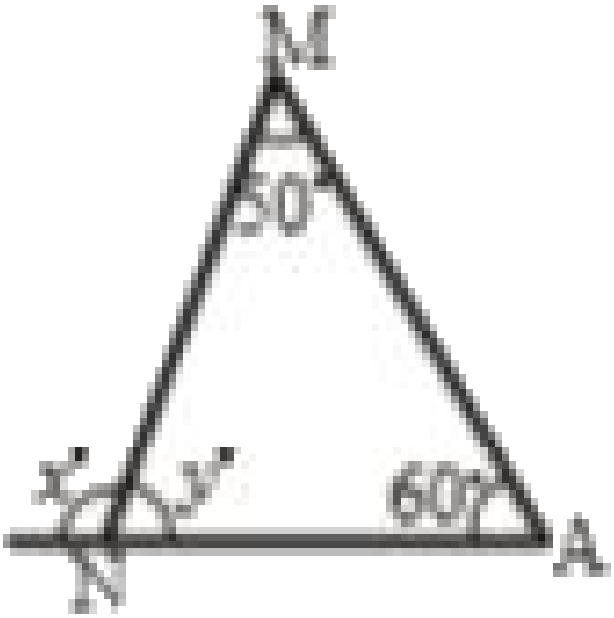
31. Find the values of unknows 'x' and 'y' in the following diagrams.



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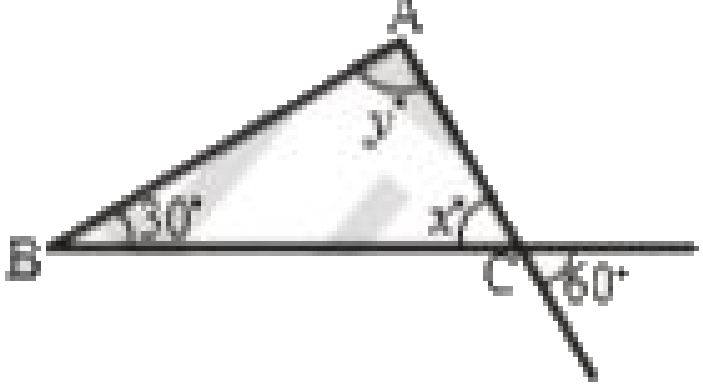
32. Find the values of unknows 'x' and 'y' in the following diagrams.



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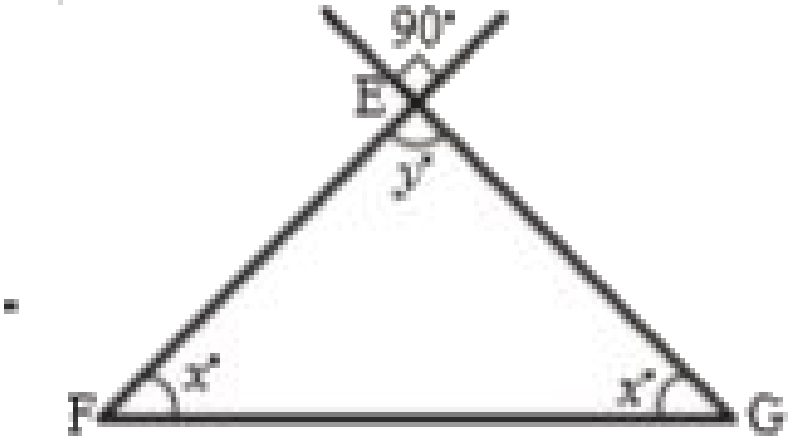
33. Find the values of unknows 'x' and 'y' in the following diagrams.



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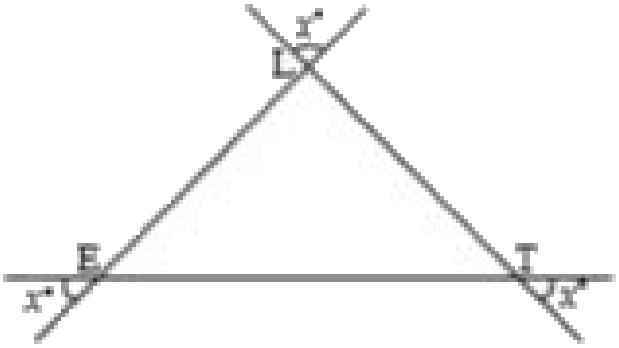
34. Find the values of unknows 'x' and 'y' in the following diagrams.



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35. Find the measure of the third angle of triangles whose two angles are given below. 38° , 102°

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36. Find the measure of the third angle of triangles whose two angles are given below. $116^\circ, 30^\circ$

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37. Find the measure of the third angle of triangles whose two angles are given below. $40^\circ, 80^\circ$

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38. In a right angled triangle, one acute angle is 30° find the other acute angle

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39. State true or false for each of the following statements: A triangle can have two right angles.

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43. The angles of a triangle are in the ratio 1 : 2 : 3.

Find the angles.

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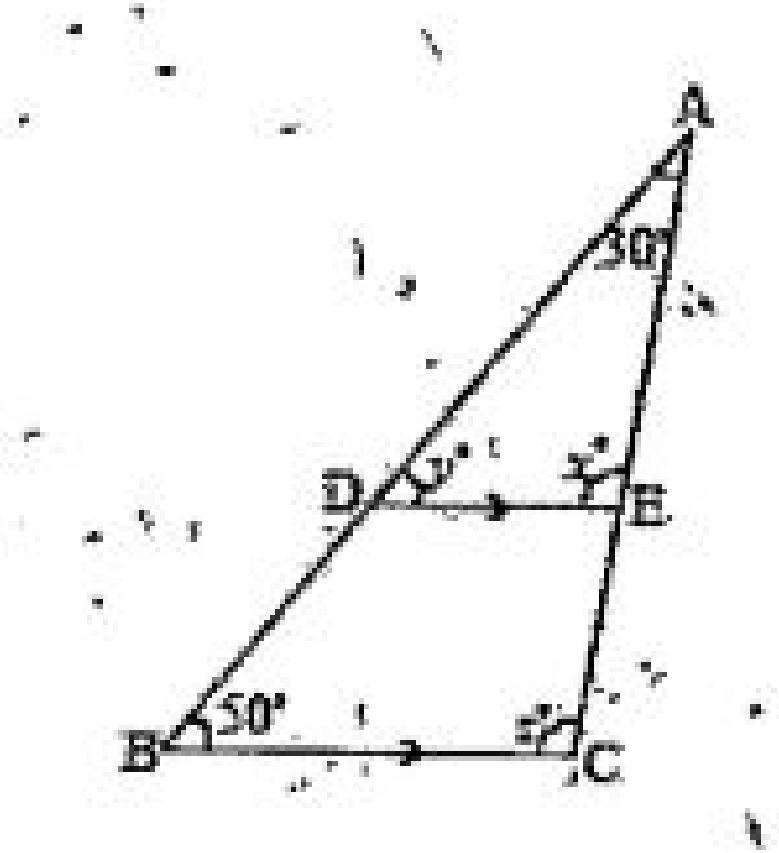
44. In the figure, $\overline{DE} \parallel \overline{BC}$, $\angle A = 30^\circ$, $\angle B = 50^\circ$

Find the values of x,y and z.



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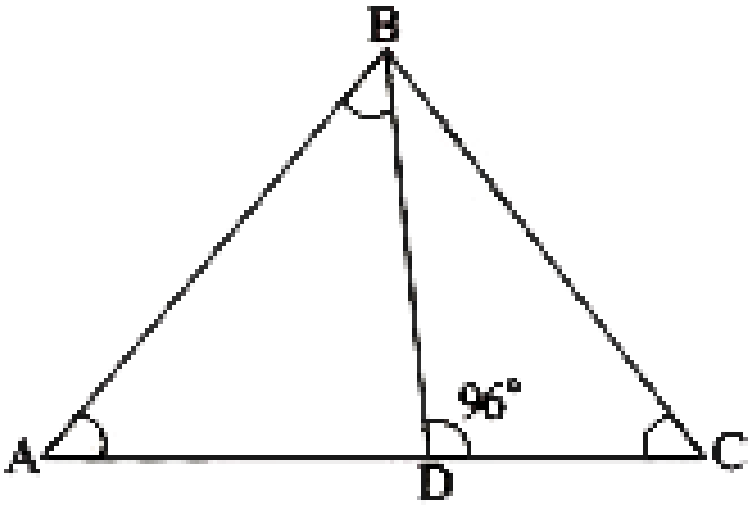
45. In the figure, $\angle ABD = 3\angle DAB$ and $\angle BDC = 96^\circ$. Find

$\angle ABD$



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46. In $\triangle PQR, \angle P = 2\angle Q$ and $2\angle R = 3\angle Q$ calculate the angles of $\triangle PQR$

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47. If the angles of a triangle are in the ratio 1: 4:5, find the angles.

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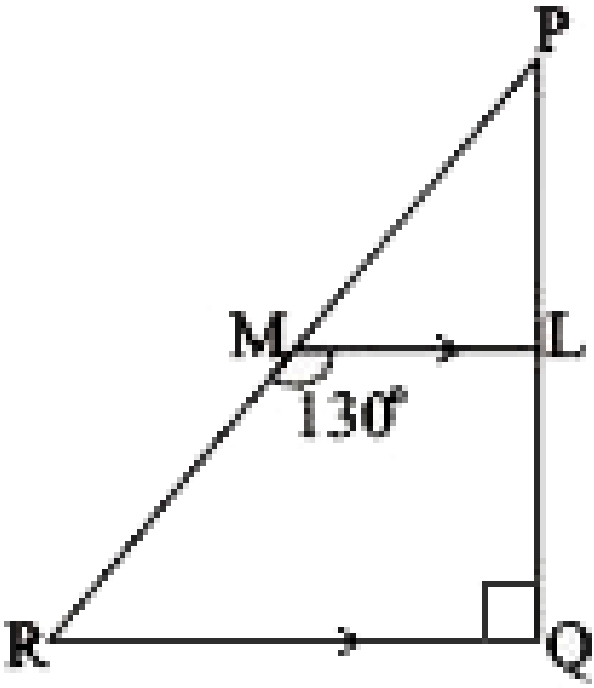
$\angle LPM, \angle PML$ and $\angle PRQ$.



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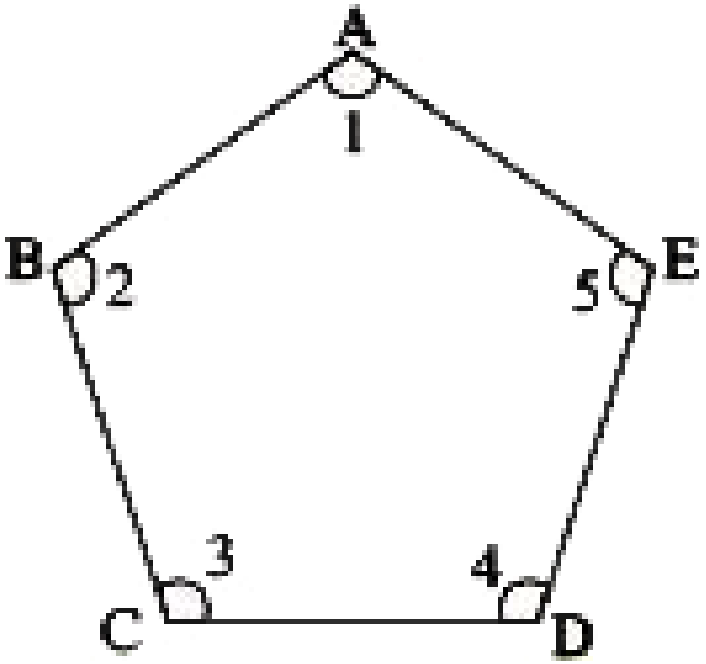
50. In Figure $ABCDE$, find

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5$.



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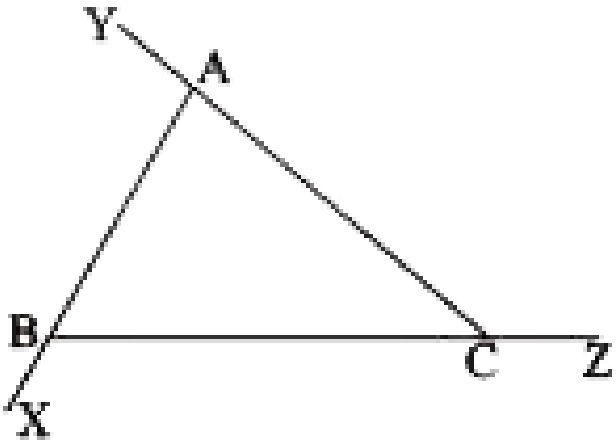
Exercise 4

1. In $\triangle ABC$, name all the interior and exterior angles of the triangle.



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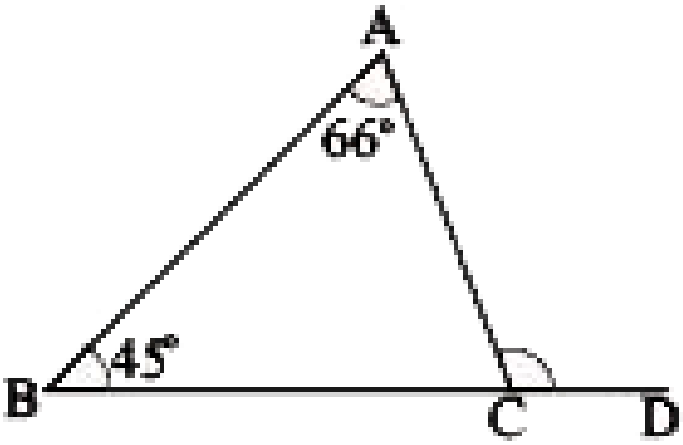
2. For $\triangle ABC$, find the measure of $\triangle ACD$.



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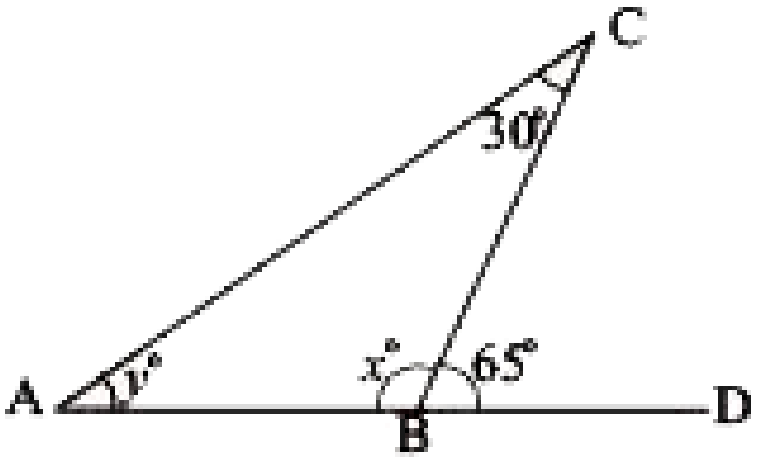
3. Find the measure of angles x and y



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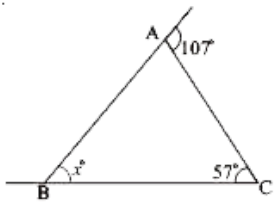
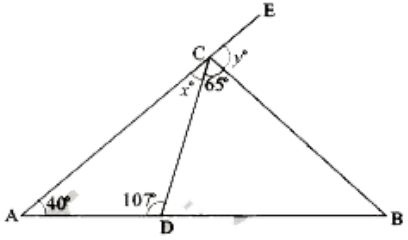
4. In the following figures, find the values of x and y.





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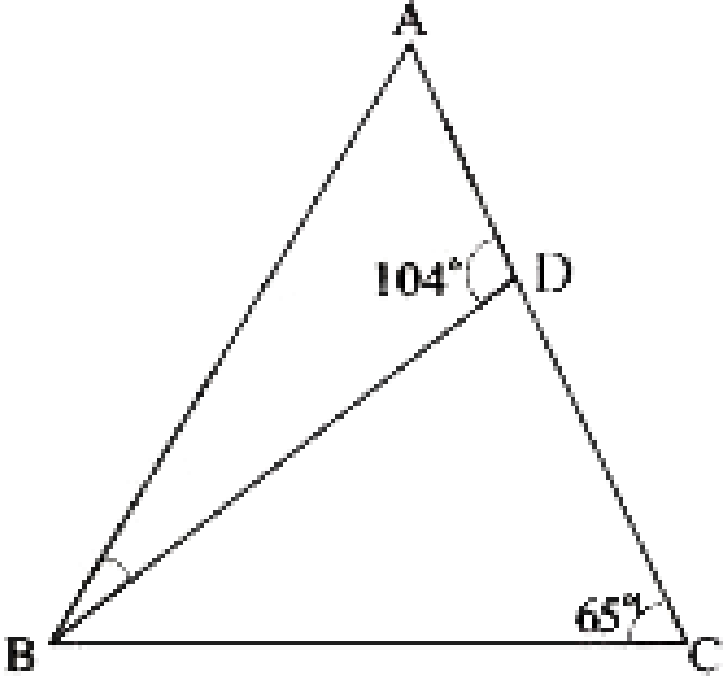
5. In the figure $\angle BAD = 3\angle DBA$, find $\angle CDB, \angle DBC$ and $\angle ABC$



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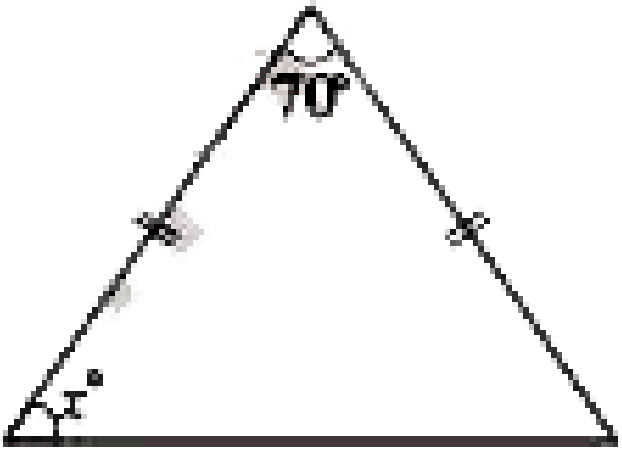
6. Find the values of x and y in the following figures.



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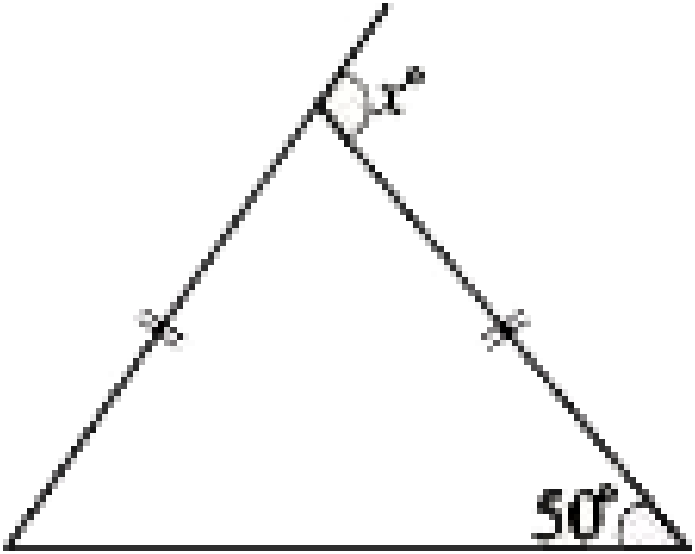
7. Find the values of x and y in the following figures.



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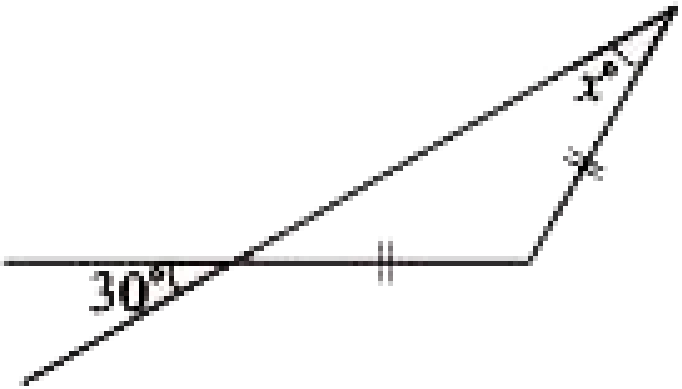
8. Find the value of x in the following figure.



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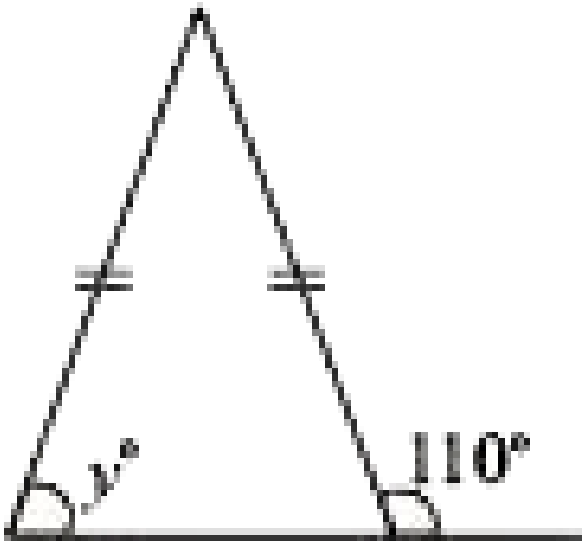
9. Find the value y in the following figure.



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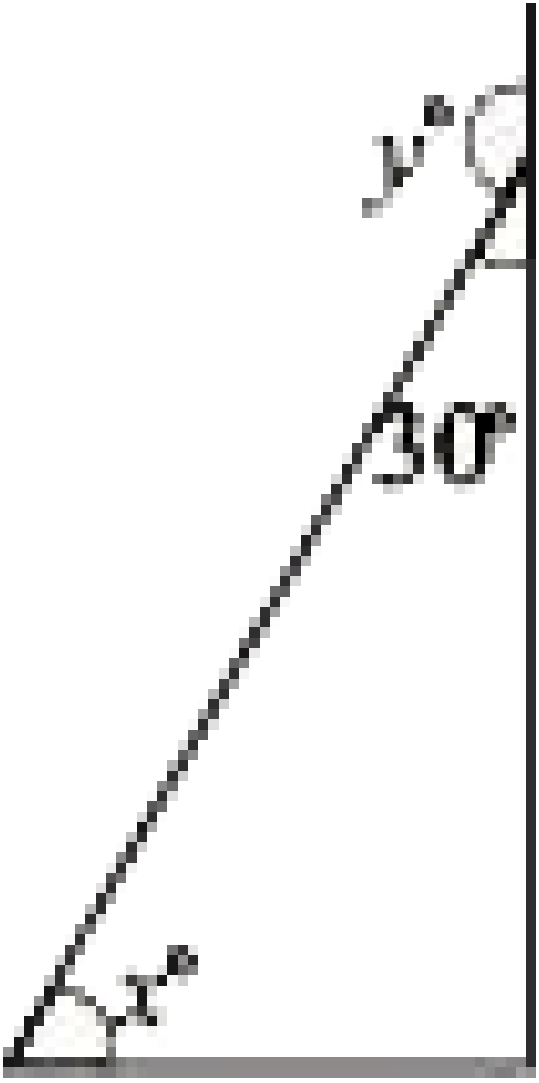
10. Find the values of x and y in the following figures.



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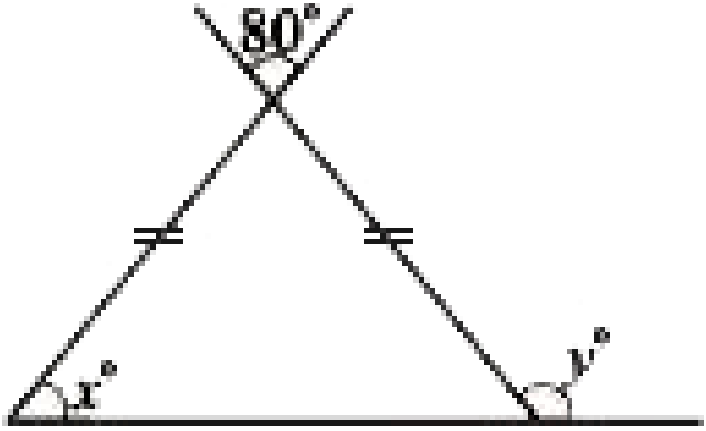
11. Find the values of x and y in the following figures.



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12. One of the exterior angles of a triangle is 125° and the interior opposite angles are in the Ratio 2:3. Find the angles of the triangle.

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13. The exterior $\angle PRSof \triangle PQR$ is 105°, If $\angle Q = 70^\circ$, find $\angle P. Is \angle PRS > \angle P$

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14. If an exterior angle of a triangle is 130° and one of the interior opposite angle is 60°. Find the Other interior opposite angle.

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15. One of the exterior angle of a triangle is 105° and the interior opposite angles are in the ratio 2:5. Find the angles of the triangle.

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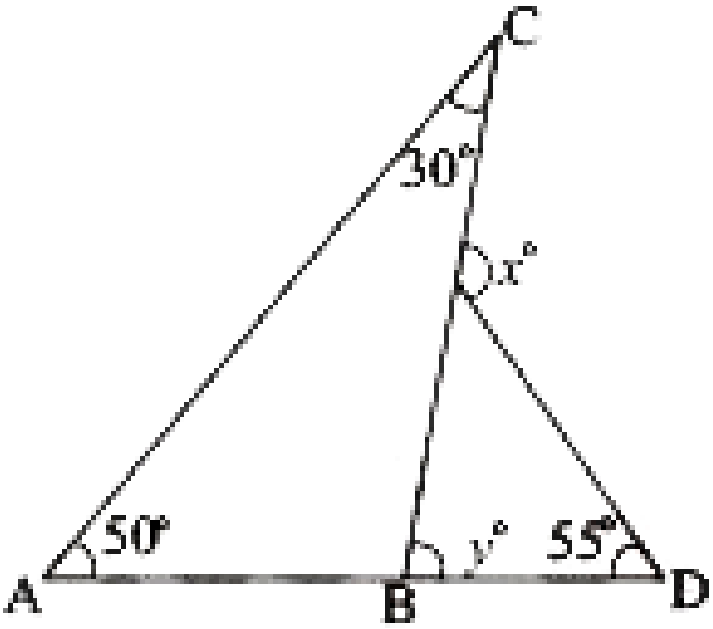
16. In the figure find the values of x and y.



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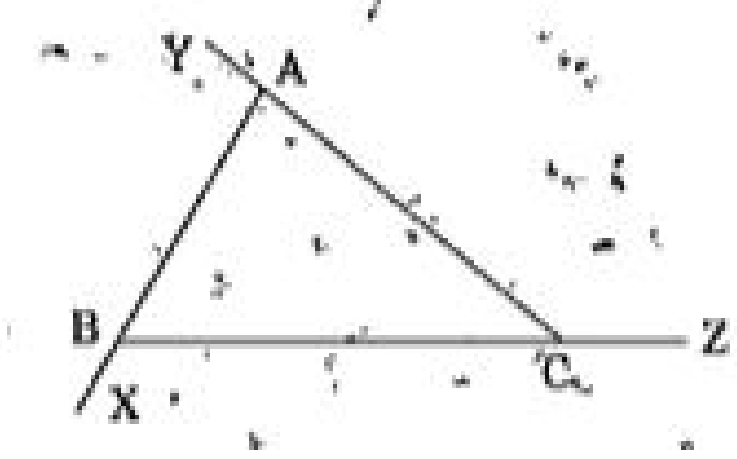
17. In $\triangle ABC$ name all the interior and exterior angles of the triangle.



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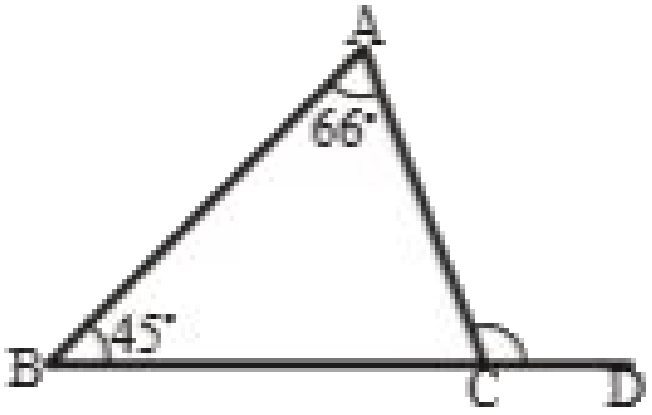
18. For ΔABC, find the measure of $\angle ACD$.



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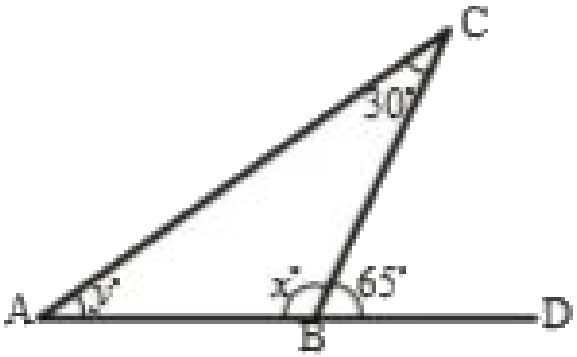
19. Find the measure of angles x and y.



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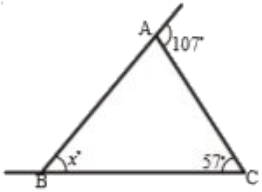
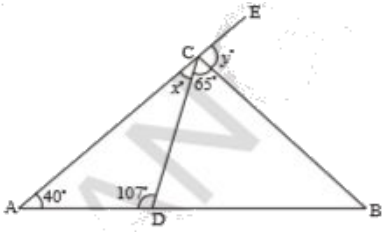
20. In the following figures, find the values of x and y.





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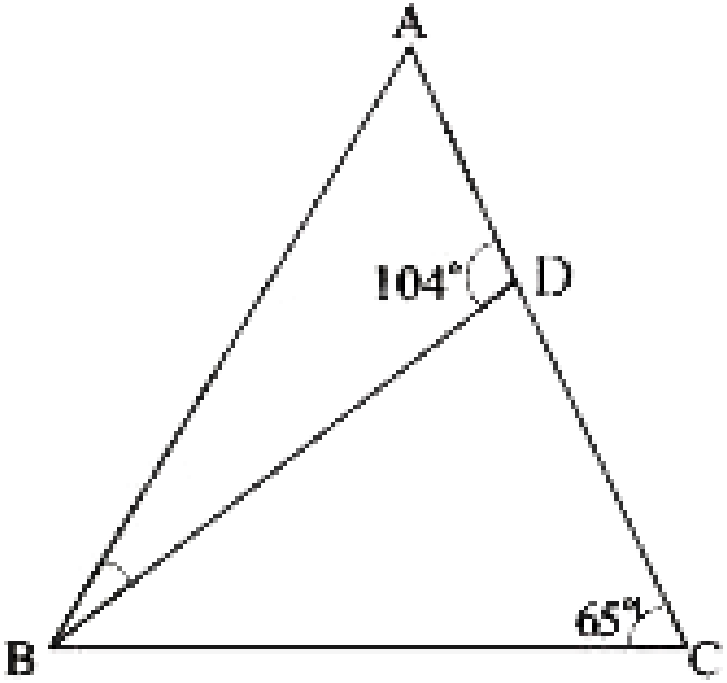
21. In the figure $\angle BAD = 3\angle DBA$, find $\angle CDB, \angle DBC$ and $\angle ABC$



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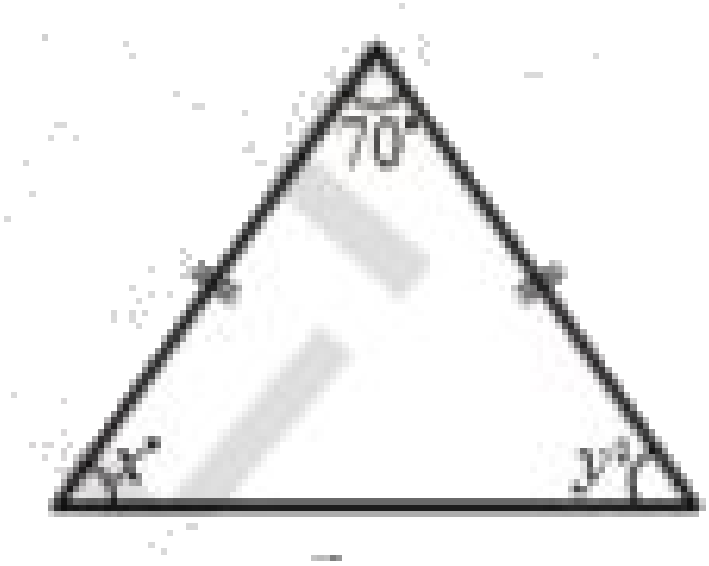
22. Find the values of x and y in the following figures.



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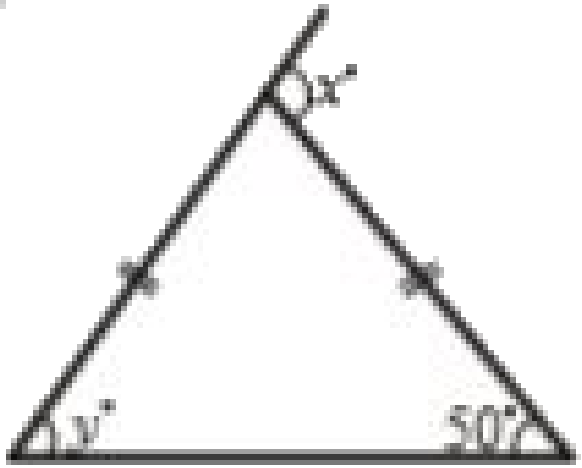
23. Find the values of x and y in the following figures.



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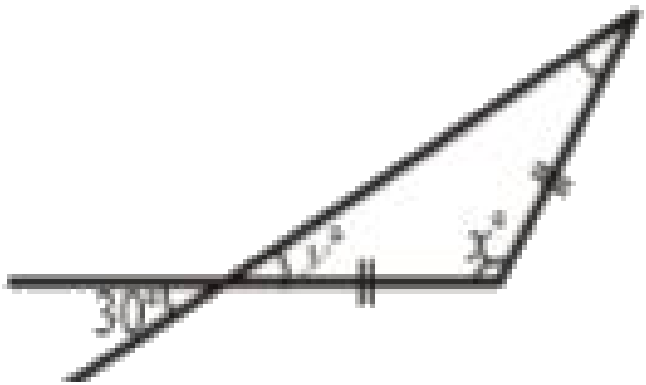
24. Find the values of x and y in the following figures.



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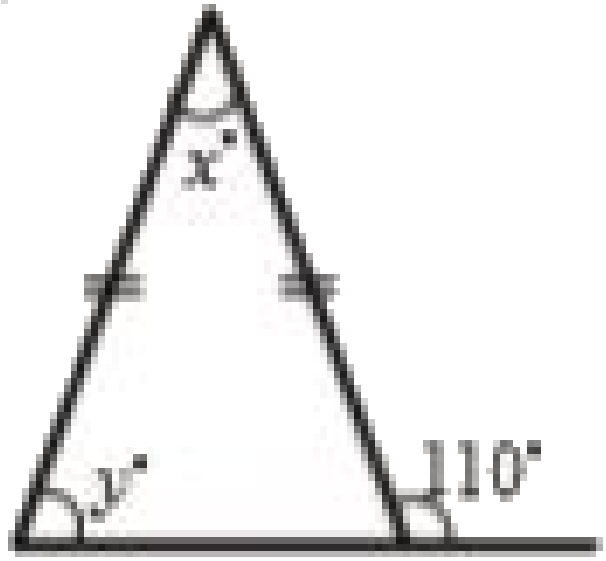
25. Find the values of x and y in the following figures.



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26. Find the values of x and y in the following figures.

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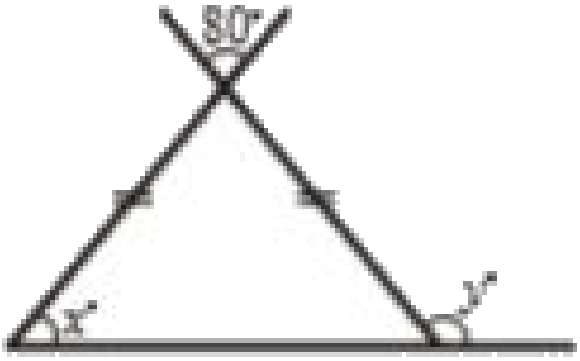
27. Find the values of x and y in the following figures.



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28. One of the exterior angles of a triangle is 125° and the interior opposite angles are in the Ratio 2:3. Find the angles of the triangle.

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29. The exterior $\angle PRSof \triangle PQR$ is 105°, If $\angle Q = 70^\circ$, find $\angle P$. $Is \angle PRS > \angle P$

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30. If an exterior angle of a triangle is 130° and one of the interior opposite angle is 60°. Find the Other interior opposite angle.

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31. One of the exterior angle of a triangle is 105° and the interior opposite angles are in the ratio 2:5. Find

the angles of the triangle.

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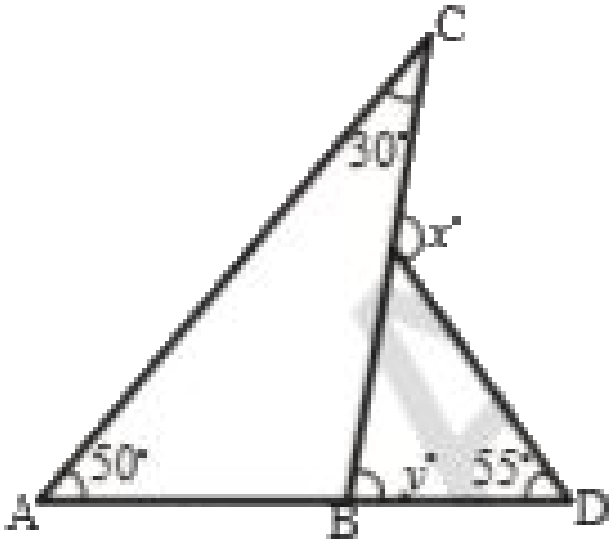
32. In the figure find the values of x and y.



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Exercise 1

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

3 cm, 4 cm and 6 cm.

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

3 cm, 4 cm and 6 cm.

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3. Is it possible to have a triangle with the following sides? 4 cm, 4 cm and 8 cm.

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

3 cm, 4 cm and 6 cm.

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