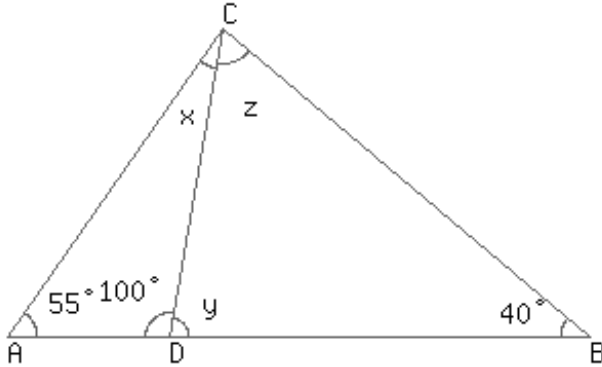


Triangle and its properties

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Answer the questions

- (1) Find the value of z ?



- (2)** In a triangle if each angle is less than sum of other two angles, What is the type of this triangle?

Choose correct answer(s) from given choice

- (3) The hypotenuse of a right angle triangle is 25 cm long. If one of the remaining side is 24 cm long, what is the length of another side?

a. 8 cm

b. 5 cm

c. 7 cm

d. 6 cm

- (4)** If 2 angles in a triangle add upto 124° then what is the value of the third angle?

a. 146°

b. 124°

c. 56°

d. 34°

- (5)** In a triangle ABC if $CB = AB$ and angle $\angle B = 100^\circ$, find the value of angle $\angle A$.

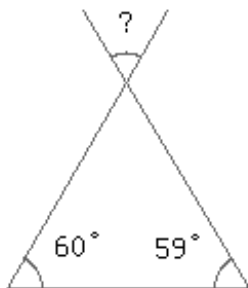
a. 50 °

b. 100°

c. 40°

d. 35 °

- (6)** Find value of missing angle



a. 51°

b. 66°

c. 61°

d. 56°

Fill in the blanks

- (12) It is not possible for an angle and its supplementary angle to be part of a triangle - (T/F)
- (13) A triangle has three angles, which we call the first, second and third angle here. The second angle is twice the first angle. The third angle is 42° . The first angle is $^\circ$.
- (14) Sulekha is walking in east direction. After walking for 55 meters, she takes a right turn, and walks for another 48 meters. She is at a distance of meters from starting point.

Check True/False

- (15) Two triangles are congruent if two sides and the angle included between them in one of the triangles are equal to the corresponding sides and the angle included between them of the other triangle
- ☐ True ☐ False



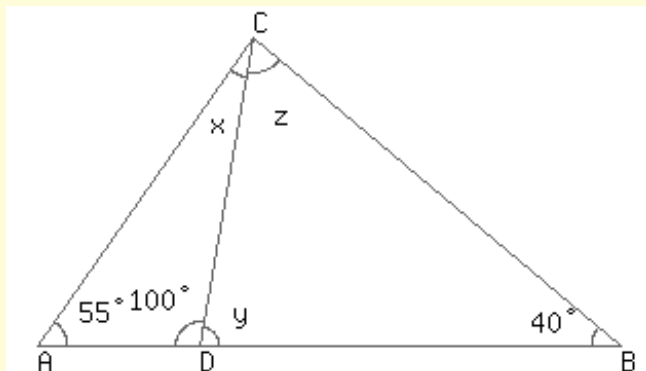
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Answers

(1) 60°

Step 1



In this figure, it is given that $\angle ADC = 100^\circ$

Therefore, $y + 100^\circ = 180^\circ$...[Sum of linear pair is 180°]

$$\Rightarrow y = 180^\circ - 100^\circ = 80^\circ$$

Step 2

Now, $40^\circ + z + y = 180^\circ$...[The sum of all three angles of a triangle is 180°]

$$\Rightarrow 40^\circ + z + 80^\circ = 180^\circ$$

$$\Rightarrow z = 180^\circ - 120^\circ$$

$$\Rightarrow z = 60^\circ$$

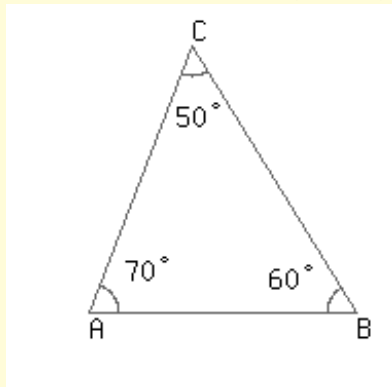
Step 3

Hence, $z = 60^\circ$

(2) Acute triangle

Step 1

According to question in a triangle, each angle is less than sum of other two angles as shown in the following triangle:



Step 2

An acute triangle is a triangle that has all angles less than 90° or each angle is less than sum of other two angles.

Step 3

Therefore this triangle is a Acute triangle.

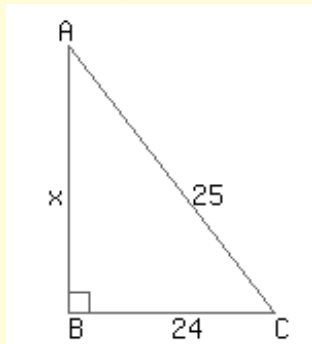
(3) c. 7 cm

Step 1

Lets assume the length of another side of a right angle triangle is x cm long.

Step 2

According to question the hypotenuse of a right angle triangle is 25 cm long and one of the remaining side is 24 cm long as shown in the following right angle triangle.

**Step 3**

Since $\triangle ABC$ is a right angle triangle,
therefore in $\triangle ABC$

$$AB^2 + BC^2 = AC^2$$

$$\Rightarrow x^2 + 24^2 = 25^2$$

$$\Rightarrow x^2 + 576 = 625$$

$$\Rightarrow x^2 = 625 - 576$$

$$\Rightarrow x^2 = 49$$

$$\Rightarrow x^2 = 7^2$$

$$\Rightarrow x = 7$$

Step 4

Now the length of another side is **7 cm**.

(4) c. 56° **Step 1**

The sum of all three angles of a triangle is 180° .

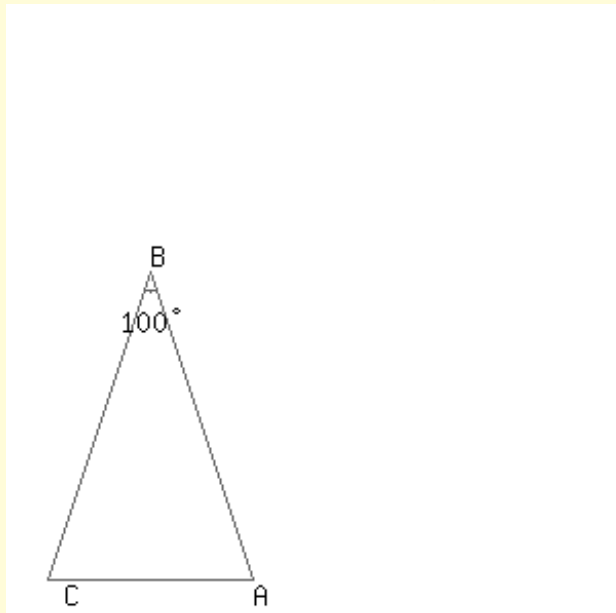
Step 2

Since 2 angles in a triangle add upto 124° .

Therefore the value of the third angle = $180^\circ - 124^\circ = 56^\circ$

(5) c. 40° **Step 1**

Let us look at the triangle ABC below where $CB=AB$. The length of two sides of triangle ABC is same. Such type of triangle is known as isosceles triangle.

**Step 2**

An isosceles triangle has two sides same as each other, and two angles opposite to those two sides also same as each other.

The angle opposite to the side CB is $\angle A$

The angle opposite to the side AB is $\angle C$

$\angle C = \angle A = x$ (Let x be the value of angle $\angle A$)

Step 3

We know that the sum of the interior angles of a triangle always add up to 180° . Thus:

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\Rightarrow x + x + 100^\circ = 180^\circ$$

$$\Rightarrow 2x = 180^\circ - 100^\circ$$

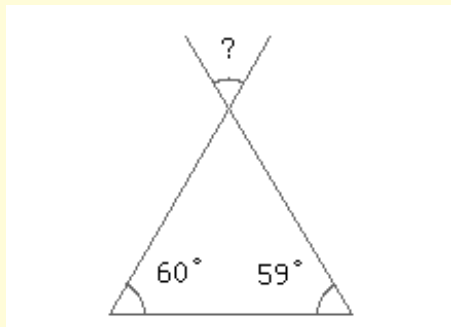
$$\Rightarrow x = \frac{80^\circ}{2}$$

$$\Rightarrow x = 40^\circ$$

$$\Rightarrow \angle A = 40^\circ$$

Step 4

Hence, the value of the angle $\angle A$ is 40° .

(6) c. 61° **Step 1**

If you look at the given triangle carefully, you will notice that the two angles of the triangle are given. Lets assume the third angle of the triangle is x .

Step 2

The sum of all three angles of a triangle is equal to 180° .

In given triangle $60^\circ + 59^\circ + x = 180^\circ$

$$\Rightarrow 119^\circ + x = 180^\circ$$

$$\Rightarrow x = 180^\circ - 119^\circ$$

$$\Rightarrow x = 61^\circ$$

Step 3

Now the missing angle = angle x [**Opposite angles**]
and hence the value of missing angle is 61° .

(7) c. 37° **Step 1**

In order to find the measure of the remaining triangle, let us assume that its value is y .

Step 2

Since it is a right angled triangle, we have an angle with 90° . Also, one of the other two angles is 53° .

Step 3

Since the sum of all angles of a triangles is 180° , we can write:

$$90^\circ + 53^\circ + y = 180^\circ$$

$$143^\circ + y = 180^\circ$$

$$y = 180^\circ - 143^\circ$$

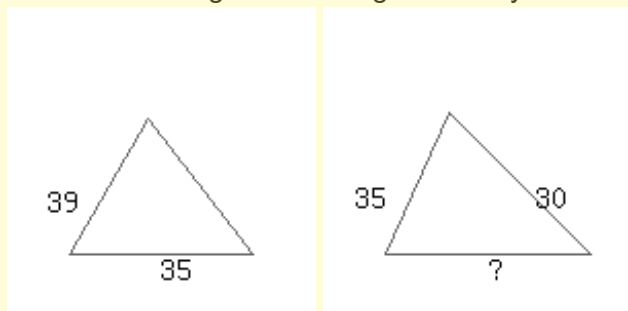
$$y = 37^\circ$$

Step 4

Hence, the value of the remaining angle is 37° .

(8) a. 39

When two triangles are congruent they will have exactly the same three sides.

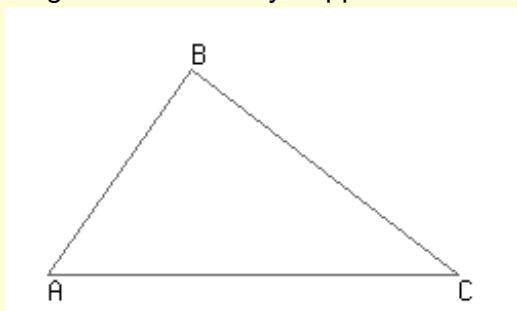


Now if you look at the given triangles carefully, you will notice that if the missing dimension in second triangle is 39, then the given triangles will have exactly the same three sides and hence the missing dimension in second triangle is 39.

(9) c. 20 meters

(10) b. $CB > AB$ **Step 1**

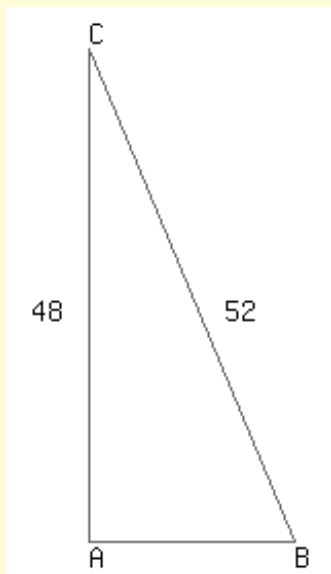
In a triangle the shortest side is always opposite to the smallest interior angle and the longest side is always opposite to the largest interior angle as shown below.

**Step 2**

According to question, in triangle ACB the $\angle A > \angle C$.

Therefore $CB > AB$ and hence the correct answer is **$CB > AB$** .

(11) a. 120 cm

Step 1

According to question in triangle $\triangle ABC$ angle $\angle A$ is a right angle, therefore the triangle $\triangle ABC$ is a right angle triangle.

Step 2

Lets assume length of AB is **x cm**.

In $\triangle ABC$

$$BC^2 = AB^2 + AC^2$$

$$\Rightarrow 52^2 = x^2 + 48^2$$

By solving it, **x = 20**.

The length of AB is **20 cm**.

Step 3

Now the perimeter of right angle triangle $\triangle ABC = AB + AC + BC$

$$= 20 + 48 + 52$$

$$= 120 \text{ cm}$$

(12) T

Step 1

Let us first recall the fact that the sum of all three angles of a triangle is 180 degrees.

Step 2

Let us now look at the definition of supplementary angles: two angles are called supplementary if the sum of their measures is 180 degrees.

Step 3

We need to find if we can have a triangle which has a pair of supplementary angles. For a moment, let us assume that such a triangle could exist. In such a triangle, the sum of two angles (supplementary ones) will be 180 degrees. This means that the third angles will need to be zero degrees.

Step 4

We know that we can not create a triangle with one of the angles being zero degrees.

Step 5

This means, it is not possible for an angle and its supplementary angle to be part of a triangle.

(13) 46

Step 1

Let the measure of the first angle be **a**.

Step 2

We have been told that the second angle is twice the first angle. This means that the measure of the second angle is **2a**.

Step 3

We have also been told that the measure of the third angle is 42° . Thus:

First angle = **a**

Second angle = **2a**, and

Third angle = 42°

Step 4

We know that the sum of all interior angles of a triangle is 180° . Thus we can write:

$$a + 2a + 42^\circ = 180^\circ$$

$$\Rightarrow 3a = 180^\circ - 42^\circ$$

$$\Rightarrow a = \frac{138^\circ}{3}$$

$$\Rightarrow a = 46^\circ$$

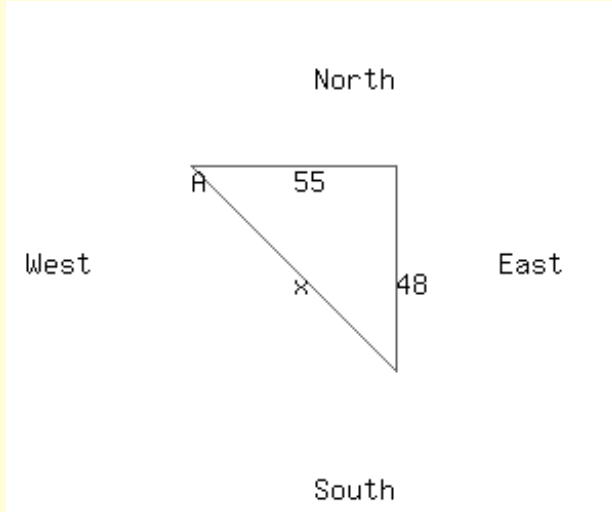
Step 5

Hence, the value of the first angle is **46°** .

(14) 73

Step 1

Lets assume Sulekha is walking in east direction from the point **A**. After walking for 55 meters, she takes a right turn, and walks for another 48 meters, and she is **x** meters from starting point as shown in the following figure.



If you look at the figure carefully, you will notice that the given figure is a right angled triangle.

Therefore you can say that $x^2 = 55^2 + 48^2$

$$\Rightarrow x^2 = 3025 + 2304$$

$$\Rightarrow x^2 = 5329$$

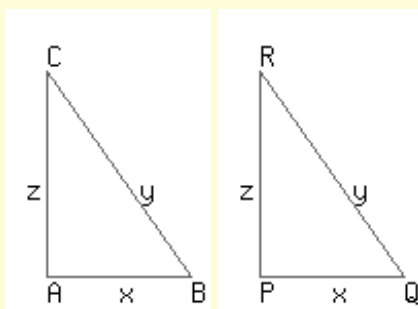
$$\Rightarrow x^2 = 73^2$$

$$\Rightarrow x = 73$$

Step 2

Now Sulekha is 73 meters far from the starting point.

(15) True



Two triangles are congruent if two sides and the angle included between them in one of the triangles are equal to the corresponding sides and the angle included between them of the other triangle as shown in the given figure and hence the statement '**Two triangles are congruent if two sides and the angle included between them in one of the triangles are equal to the corresponding sides and the angle included between them of the other triangle**' is true.