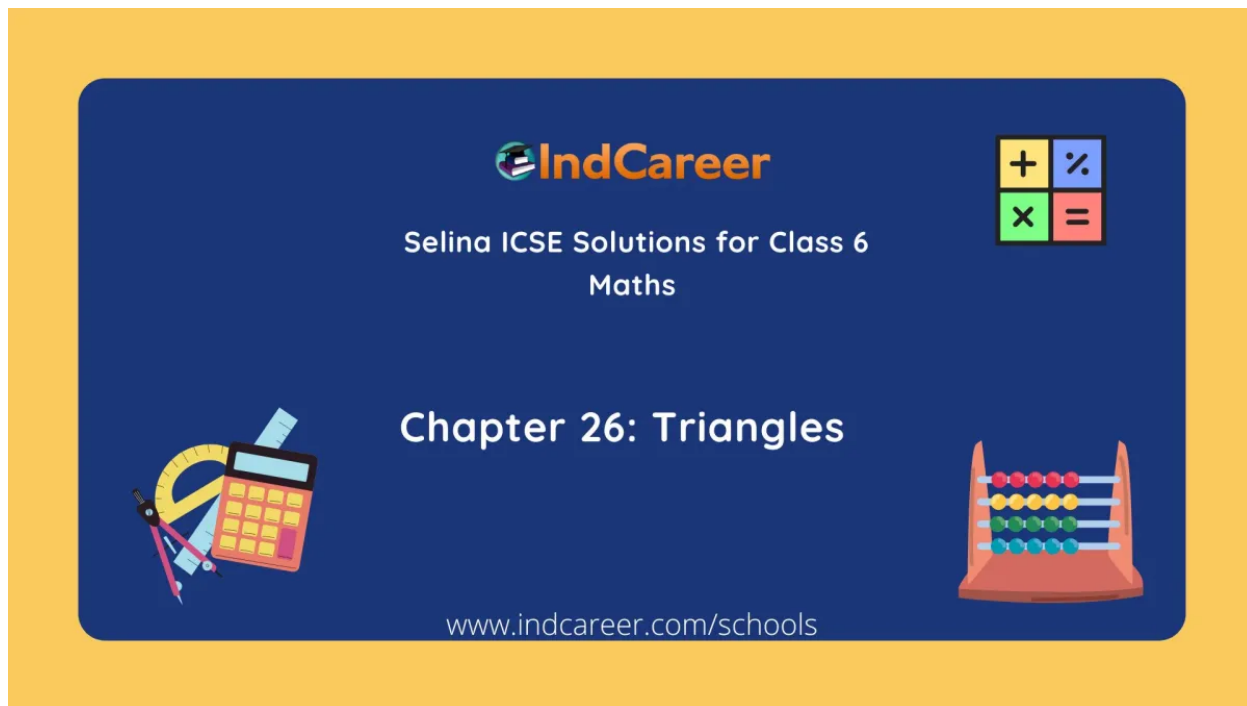


Selina Class 6 ICSE Solutions Mathematics : Chapter 26- Triangles



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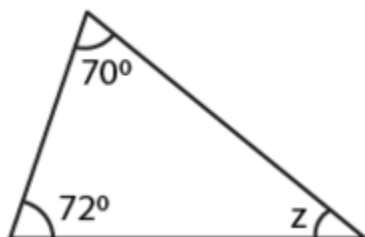
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Exercise 26(A)

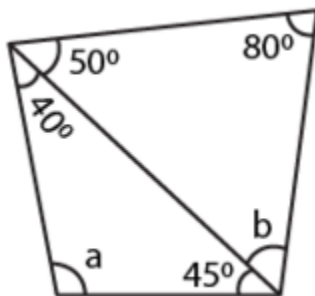
1. In each of the following, find the marked unknown angles:

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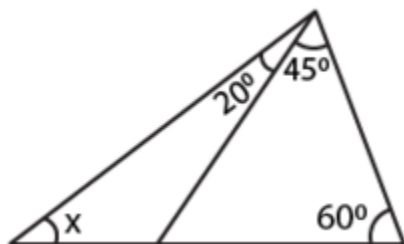
(i)



(ii)



(iii)



Solution:

(i) We know that,

Sum of all angles of triangle = 180°

Therefore,

$$70^\circ + 72^\circ + z = 180^\circ$$

$$142^\circ + z = 180^\circ$$

$$z = 180^\circ - 142^\circ$$

We get,

$$z = 38^\circ$$

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(ii) We know that,

Sum of all angles of a triangle = 180°

First triangle

$$50^\circ + 80^\circ + b = 180^\circ$$

$$130^\circ + b = 180^\circ$$

$$b = 180^\circ - 130^\circ$$

We get,

$$b = 50^\circ$$

Second triangle

$$40^\circ + 45^\circ + a = 180^\circ$$

$$85^\circ + a = 180^\circ$$

$$a = 180^\circ - 85^\circ$$

We get,

$$a = 95^\circ$$

$$(iii) 60^\circ + 45^\circ + 20^\circ + x = 180^\circ$$

$$125^\circ + x = 180^\circ$$

$$x = 180^\circ - 125^\circ$$

We get,

$$x = 55^\circ$$

2. Can a triangle together have the following angles?

(i) 55° , 55° and 80°

(ii) 33° , 74° and 73°

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(iii) 85° , 95° and 22°

Solution:

(i) Sum of all angles of a triangle = 180°

Here,

$$55^\circ + 55^\circ + 80^\circ = 180^\circ$$

We get,

$$190^\circ \neq 180^\circ$$

Therefore, it cannot form a triangle

$$(ii) 33^\circ + 74^\circ + 73^\circ = 180^\circ$$

We get,

$$180^\circ = 180^\circ$$

Therefore, it form a triangle

$$(iii) 85^\circ + 95^\circ + 22^\circ = 180^\circ$$

We get,

$$202^\circ \neq 180^\circ$$

Therefore, it cannot form a triangle

3. Find x, if the angles of a triangle are:

(i) x° , x° , x°

(ii) x° , $2x^\circ$, $2x^\circ$

(iii) $2x^\circ$, $4x^\circ$, $6x^\circ$

Solution:

We know that,

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The sum of all the angles in a triangle is 180°

So,

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

$$3x = 180^\circ$$

$$x = 180^\circ / 3$$

We get,

$$x = 60^\circ$$

The value of $x = 60^\circ$

(ii) We know that,

The sum of all the angles in a triangle is 180°

So,

$$x + 2x + 2x = 180^\circ$$

$$5x = 180^\circ$$

$$x = 180^\circ / 5$$

We get,

$$x = 36^\circ$$

Therefore, the value of $x = 36^\circ$

(iii) We know that,

The sum of all the angles in a triangle is 180°

So,

$$2x + 4x + 6x = 180^\circ$$

$$12x = 180^\circ$$

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$$x = 180^\circ / 12$$

We get,

$$x = 15^\circ$$

Therefore, the value of $x = 15^\circ$

4. One angle of a right-angled triangle is 70° . Find the other acute angle.

Solution:

We know that,

Sum of all the angles in a triangle = 180°

Let us consider the acute angle as x

Hence,

$$x + 90^\circ + 70^\circ = 180^\circ$$

$$x + 160^\circ = 180^\circ$$

$$x = 180^\circ - 160^\circ$$

We get,

$$x = 20^\circ$$

Therefore, the acute angle is 20°

5. In $\triangle ABC$, $\angle A = \angle B = 62^\circ$; find $\angle C$

Solution:

Given

$$\angle A = \angle B = 62^\circ$$

So,

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

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$$62^{\circ} + 62^{\circ} + \angle C = 180^{\circ}$$

$$124^{\circ} + \angle C = 180^{\circ}$$

$$\angle C = 180^{\circ} - 124^{\circ}$$

We get,

$$\angle C = 56^{\circ}$$

Hence, $\angle C = 56^{\circ}$

6. In $\triangle ABC$, $\angle B = \angle C$ and $\angle A = 100^{\circ}$; find $\angle B$.

Solution:

Given

$$\angle B = \angle C$$

We know that,

Sum of all the angles in a triangle is 180°

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

$$100^{\circ} + \angle B + \angle B = 180^{\circ}$$

$$100^{\circ} + 2\angle B = 180^{\circ}$$

$$2\angle B = 180^{\circ} - 100^{\circ}$$

We get,

$$2\angle B = 80^{\circ}$$

$$\angle B = 80^{\circ} / 2$$

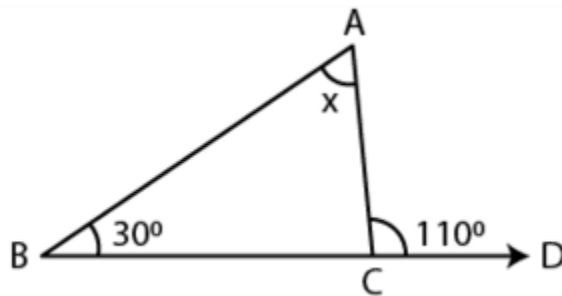
$$\angle B = 40^{\circ}$$

Therefore, $\angle B + \angle C = 40^{\circ}$

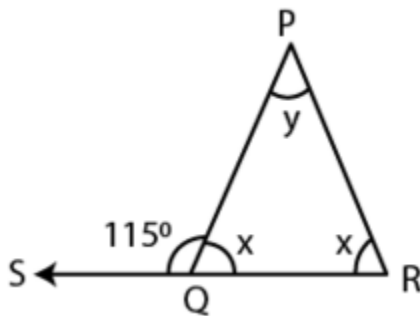
7. Find, giving reasons, the unknown marked angles, in each triangle drawn below:

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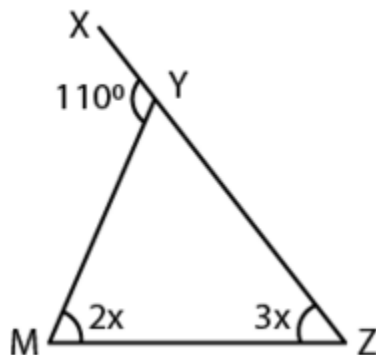
(i)



(ii)



(iii)

**Solution:**

We know that,

Exterior angle of a triangle is always equal to the sum of its two interior opposite angles (property)

So,

$$(i) 110^\circ = x + 30^\circ \text{ [By property]}$$

$$x = 110^\circ - 30^\circ$$

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We get,

$$x = 80^{\circ}$$

(ii) $x + 115^{\circ} = 180^{\circ}$ [By linear property of angles]

$$x = 180^{\circ} - 115^{\circ}$$

We get,

$$x = 65^{\circ}$$

By exterior angle property

$$x + y = 115^{\circ}$$

$$65^{\circ} + y = 115^{\circ}$$

$$y = 115^{\circ} - 65^{\circ}$$

We get,

$$y = 50^{\circ}$$

Therefore the value of angle x is 65° and y is 50°

(iii) By exterior angle property,

$$110^{\circ} = 2x + 3x$$

$$5x = 110^{\circ}$$

$$x = 110^{\circ} / 5$$

We get,

$$x = 22^{\circ}$$

Hence,

$$\text{The value of } 2x = 2 \times 22$$

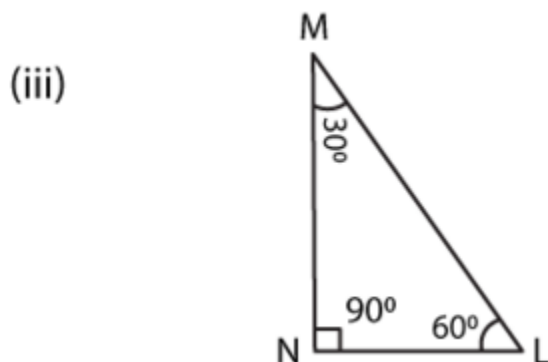
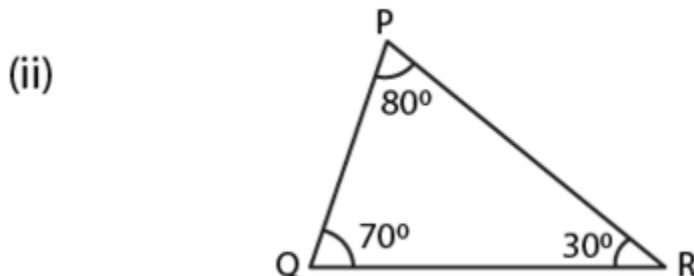
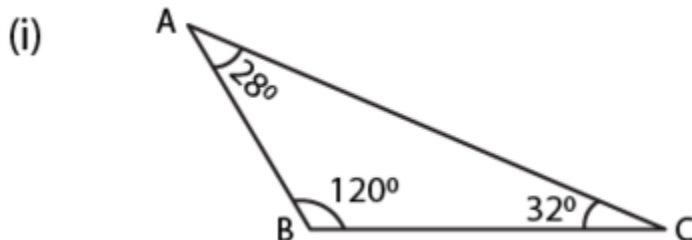
$$= 44^{\circ}$$

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The value of $3x = 3 \times 22$

$= 66^\circ$

8. Classify the following triangles according to angle:



Solution:

(i) Since, one of the angle of a triangle is 120° .

Therefore, it is obtuse angled triangle

(ii) Since, all the angles of a triangle is less than 90°

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Therefore, it is acute angled triangle

(iii) Since $\angle MNL = 90^\circ$ and

Sum of two acute angles,

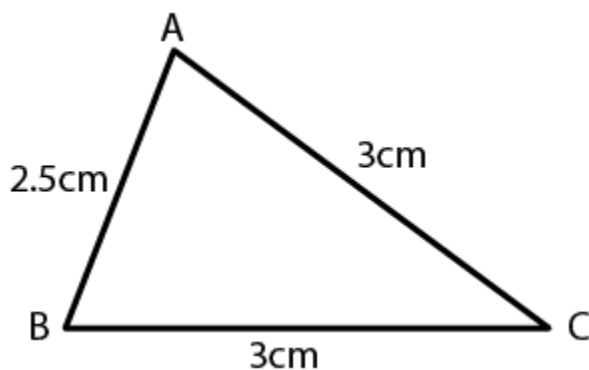
$$\angle M + \angle N = 30^\circ + 60^\circ$$

$$= 90^\circ$$

Therefore, it is right angled triangle

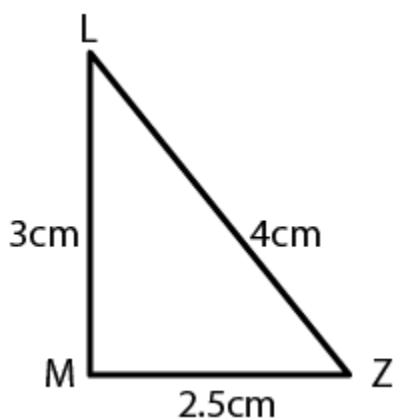
9. Classify the following triangles according to sides:

(i)

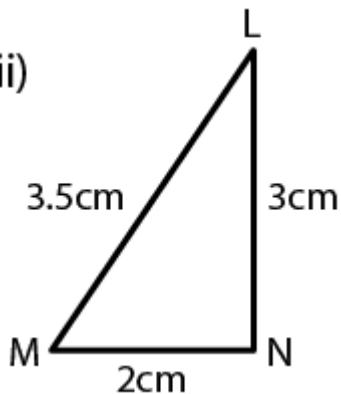


(ii)

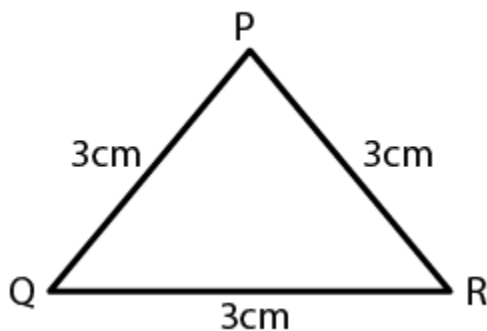
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(iii)



(iv)



Solution:

(i) In the given triangle, we find two sides are equal.

Therefore, it is isosceles triangle

(ii) In the given triangle, all the three sides are unequal.

Therefore, it is scalene triangle

(iii) In the given triangle, all the three sides are unequal.

Therefore, it is scalene triangle

(iv) In the given triangle, all the three sides are equal.

Therefore, it is equilateral triangle

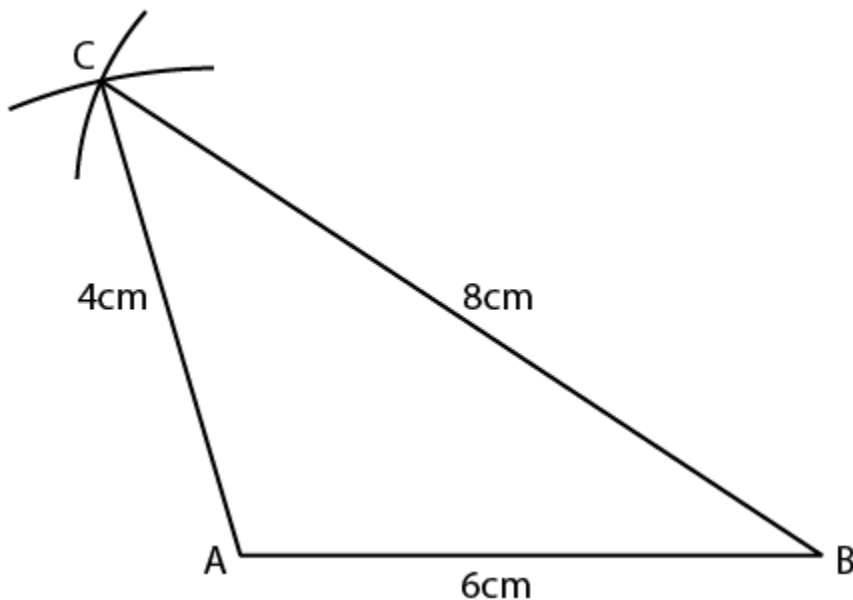
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Exercise 26(B)

1. Construct triangle ABC, when:

AB = 6 cm, BC = 8 cm and AC = 4 cm

Solution:



Given

AB = 6 cm

BC = 8 cm

AC = 4 cm

Now,

Steps of Construction:

(i) Draw a line AB of length 6 cm

(ii) Using compasses, take B as centre, and draw an arc of 8 cm radius

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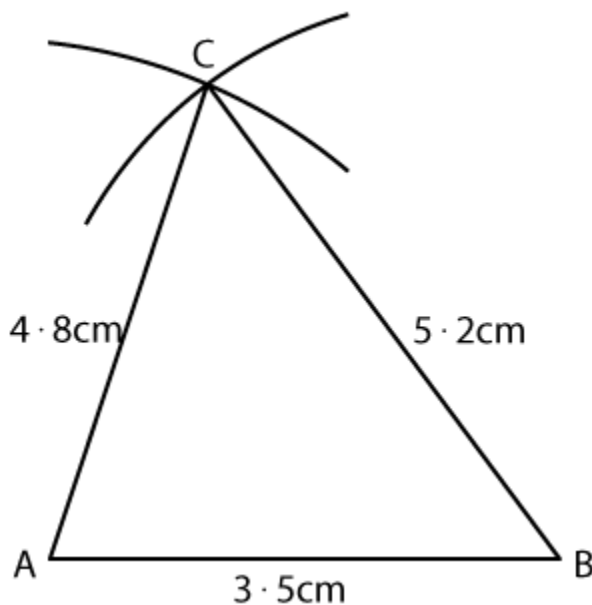
(iii) Again, taking A as centre, draw another arc of 4 cm radius, which cuts the previous arc at point C

(iv) Now join AC and BC

The obtained triangle ABC is the required triangle.

2. $AB = 3.5$ cm, $AC = 4.8$ cm and $BC = 5.2$ cm

Solution:



Given

$AB = 3.5$ cm

$AC = 4.8$ cm

$BC = 5.2$ cm

Steps of Construction:

(i) Draw a line AB of length 3.5 cm

(ii) With the help of compasses, taking B as centre, draw an arc of 5.2 cm radius

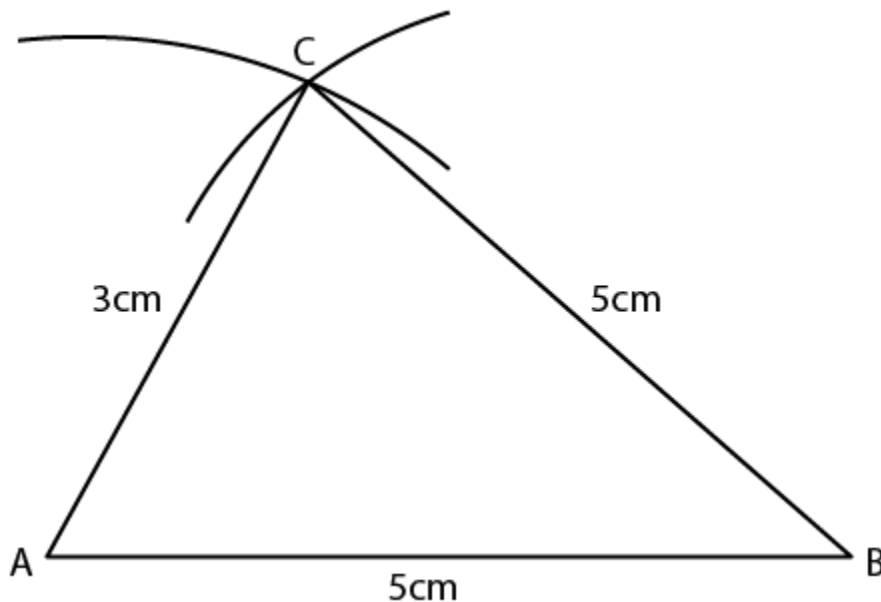
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(iii) Again with A as centre, draw an arc of 4.8 radius

(iv) Now, join AC and BC

3. $AB = BC = 5$ cm and $AC = 3$ cm. Measure angles A and C. Is $\angle A = \angle C$?

Solution:



Given

$AB = BC = 5$ cm

$AC = 3$ cm

Steps of Construction:

(i) Draw a line AB of length 5 cm

(ii) Using compasses take B as centre and draw an arc of 5 cm radius

(iii) Now, taking A as centre, draw another arc of 3 cm radius, which cuts the previous arc at point C

(iv) Now, join AC and BC

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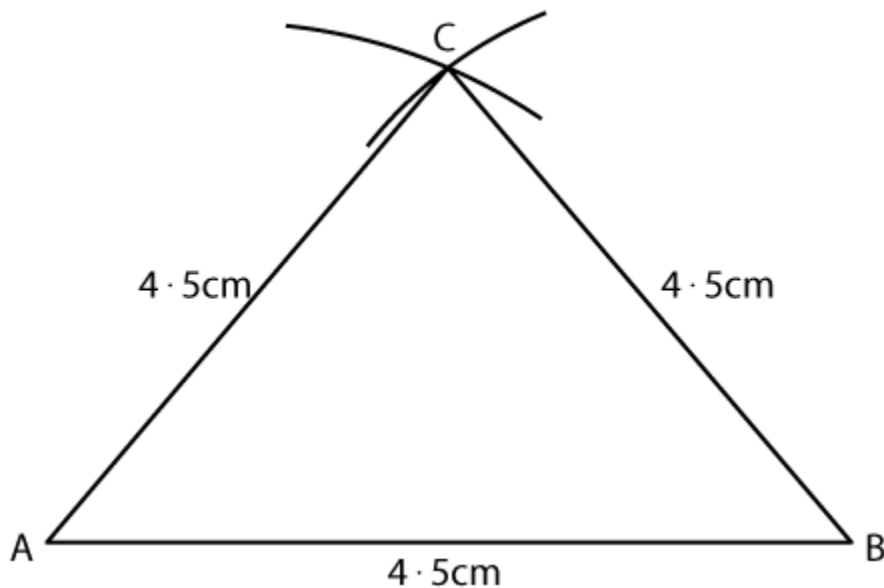
Measuring angles A and C, we get

$$\angle A = 72.5^\circ \text{ and } \angle C = 72.5^\circ$$

Hence, yes $\angle A = \angle C$.

4. $AB = BC = CA = 4.5$ cm. Measure all the angles of the triangle. Are they equal?

Solution:



Given

$$AB = BC = CA = 4.5 \text{ cm}$$

Steps of Construction:

- (i) Draw a line AB of length 4.5 cm
- (ii) Using compasses and taking B as centre, draw an arc of 4.5 cm radius
- (iii) Again taking A as centre, draw another arc of 4.5 cm radius, which cuts the previous arc at point C
- (iv) Now, join AC and BC

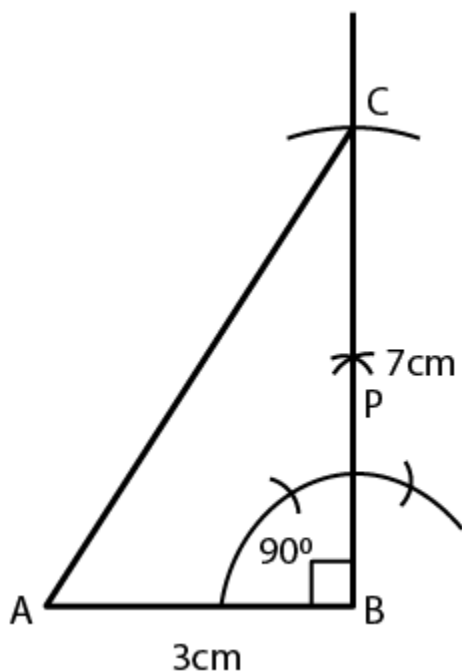
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(v) All the angles in ABC i.e $\angle A = \angle B = \angle C = 60^\circ$

Since $AB = BC = CA = 4.5$ cm and all the angles are equal. Hence, it is an equilateral triangle

5. $AB = 3$ cm, $BC = 7$ cm and $\angle B = 90^\circ$

Solution:



Given

$AB = 3$ cm,

$BC = 7$ cm and

$\angle B = 90^\circ$

Steps of Construction:

(i) Draw a line segment AB of length 3 cm

(ii) Using compasses, construct $\angle ABC = 90^\circ$

(iii) Taking B as centre, draw an arc of 7 cm length and mark as point C i.e $BC = 7$ cm

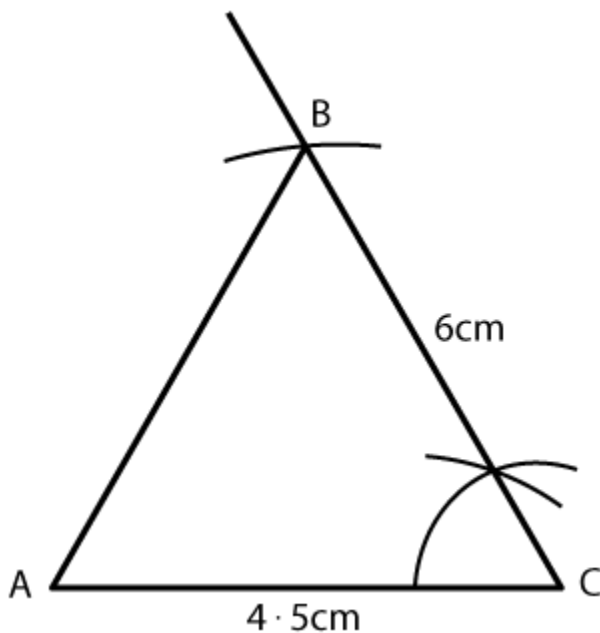
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(iv) Now, join A and C

(v) The obtained $\triangle ABC$, is the required triangle

6. $AC = 4.5$ cm, $BC = 6$ cm and $\angle C = 60^\circ$

Solution:



Given

$AC = 4.5$ cm

$BC = 6$ cm

$\angle C = 60^\circ$

Steps of Construction:

(i) Draw a line AC of length 4.5 cm

(ii) Using compasses, construct $\angle ACB = 60^\circ$

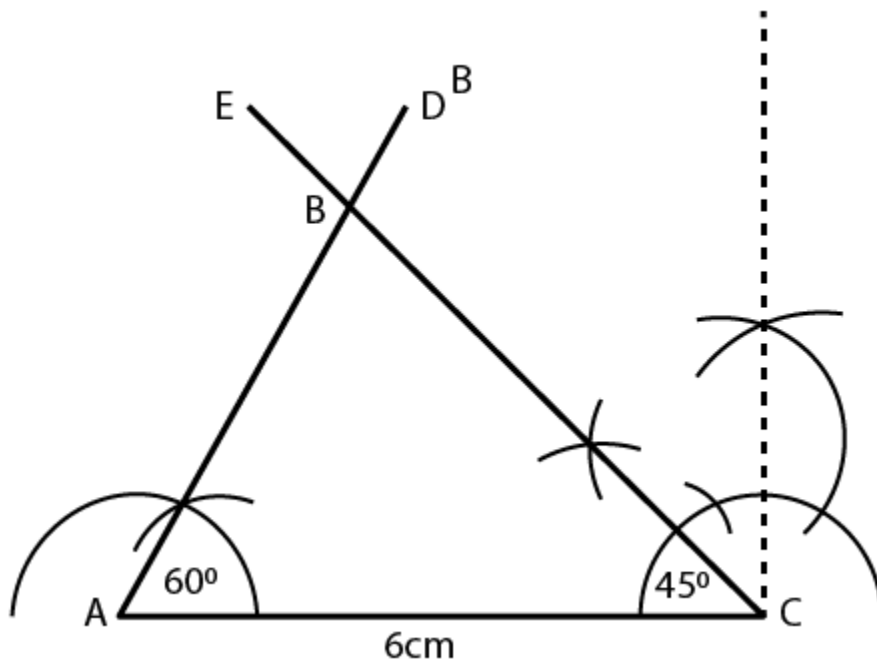
(iii) Draw an arc of 6 cm radius and mark it as B such that $BC = 6$ cm

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(iv) Now, join B and A

7. $AC = 6 \text{ cm}$, $\angle A = 60^\circ$ and $\angle C = 45^\circ$. Measure AB and BC.

Solution:



Given

$AC = 6 \text{ cm}$

$\angle A = 60^\circ$

$\angle C = 45^\circ$

Steps of Construction:

(i) Draw a line segment AC of length 6 cm

(ii) With the help of Compass, construct $\angle A = 60^\circ$

(iii) Again, using compass, construct $\angle C = 45^\circ$

(iv) AD and CE intersect each other at point B

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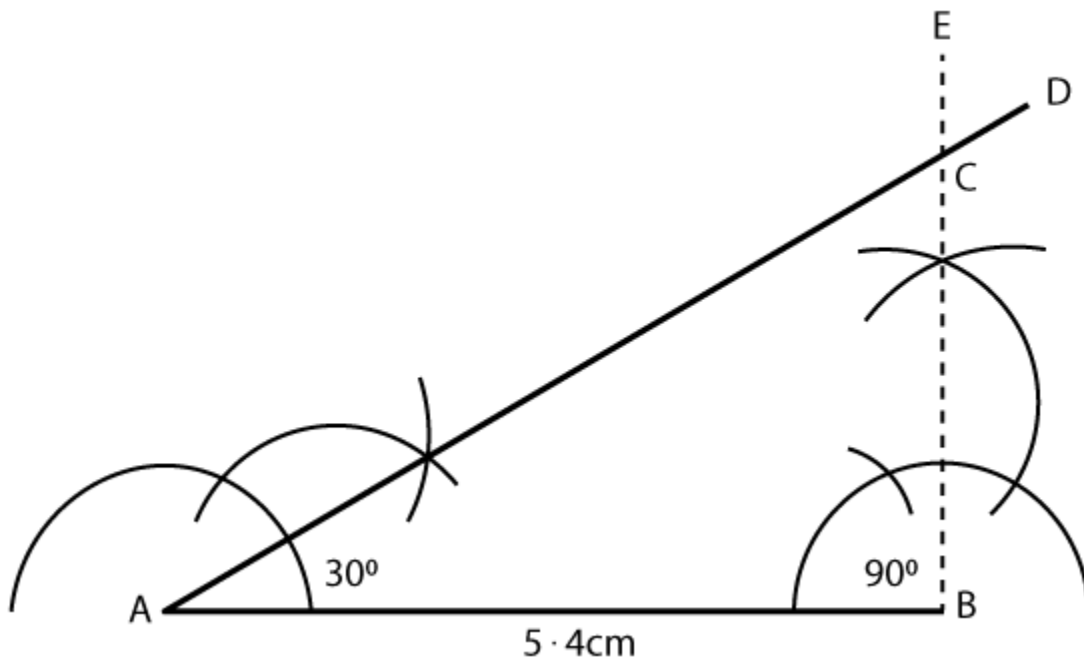
(v) Now, the obtained $\triangle ABC$ is the required triangle

(vi) Measure the side AB and BC with the help of a scale

(vii) We get, AB = 4.4 cm and BC = 5.4 cm

8. AB = 5.4 cm, $\angle A = 30^\circ$ and $\angle B = 90^\circ$. Measure $\angle C$ and side BC.

Solution:



Given

AB = 5.4 cm

$\angle A = 30^\circ$ and

$\angle B = 90^\circ$

Steps of Construction:

(i) Draw a line segment AB of length 5.4 cm

(ii) With the help of compass, construct $\angle A = 30^\circ$

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(iii) Similarly, construct $\angle B = 90^\circ$

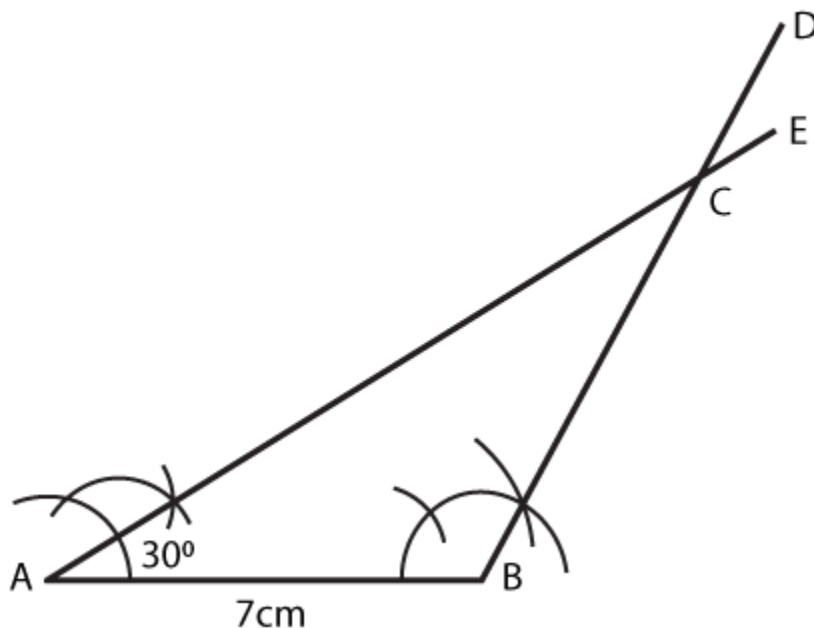
(iv) AD and BE intersect each other at point C

(v) Hence, the obtained $\triangle ABC$ is the required triangle

(vi) On measuring we get, $\angle C = 60^\circ$ and side $BC = 3.1$ cm approximately

9. $AB = 7$ cm, $\angle B = 120^\circ$ and $\angle A = 30^\circ$. Measure AC and BC.

Solution:



Given

$AB = 7$ cm

$\angle B = 120^\circ$

$\angle A = 30^\circ$

Steps of Construction:

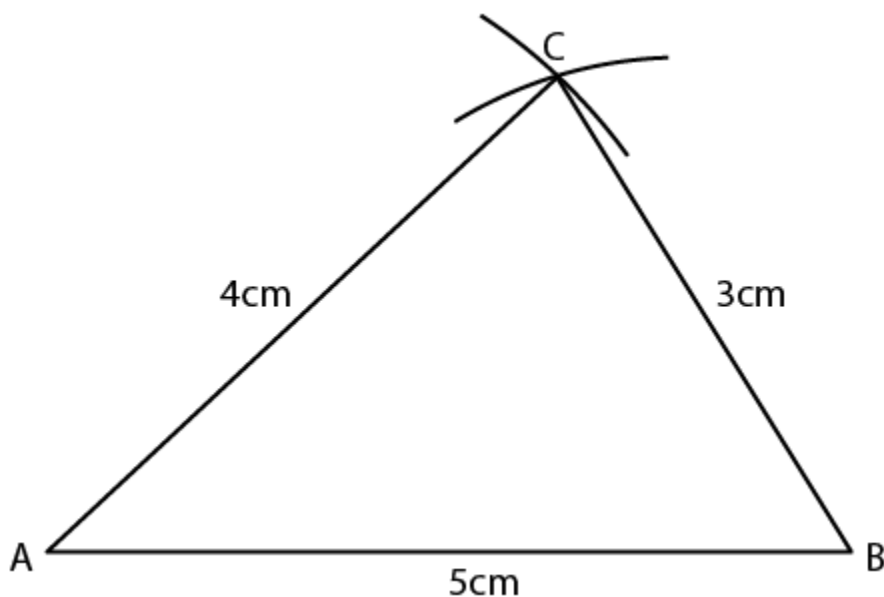
(i) Draw a line segment AB of length 7 cm

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- (ii) With the help of a compass, construct $\angle A = 30^\circ$
- (iii) AE and BD intersect each other at point C
- (iv) Hence, the obtained $\triangle ABC$ is the required triangle
- (v) On measuring the lengths, we get $AC = 12$ cm and $BC = 7$ cm respectively

10. $BC = 3$ cm, $AC = 4$ cm and $AB = 5$ cm. Measure angle ACB. Give a special name to this triangle

Solution:



Given

$BC = 3$ cm

$AC = 4$ cm and

$AB = 5$ cm

Steps of Construction:

- (i) Draw a line segment AB of length 5 cm

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- (ii) From B, using compass cut an arc of 3 cm radius
- (iii) Similarly, from A again with the help of compass, cut an arc of 4 cm bisecting the previous arc formed from point B
- (iv) Now, join point C with A and B
- (v) The obtained triangle is the required $\triangle ABC$
- (vi) On measuring $\angle ACB$, we get $\angle ACB = 90^\circ$.

Therefore, the obtained triangle ABC is a right angled triangle



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