

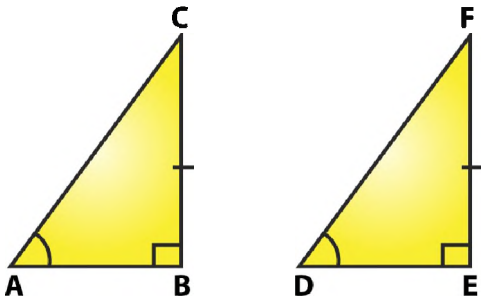
Solutions for Class 9 Maths Chapter 10 Congruent Triangles

Exercise 10.3

Question 1: In two right triangles one side and acute angle of one are equal to the corresponding side and angle of the other. Prove that the triangles are congruent.

Solution:

In two right triangles one side and acute angle of one are equal to the corresponding side and angles of the other. (Given)



To prove: Both the triangles are congruent.

Consider two right triangles such that

$$\angle B = \angle E = 90^\circ \quad \text{.....(i)}$$

$$AB = DE \quad \text{.....(ii)}$$

$$\angle C = \angle F \quad \text{.....(iii)}$$

Here we have two right triangles, $\triangle ABC$ and $\triangle DEF$

From (i), (ii) and (iii),

By AAS congruence criterion, we have $\triangle ABC \cong \triangle DEF$

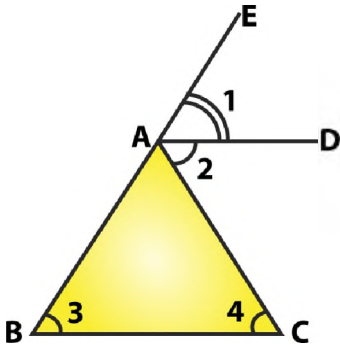
Both the triangles are congruent. Hence proved.

Question 2: If the bisector of the exterior vertical angle of a triangle be parallel to the base. Show that the triangle is isosceles.

Solution:

Solutions for Class 9 Maths Chapter 10 Congruent Triangles

Let ABC be a triangle such that AD is the angular bisector of exterior vertical angle, $\angle EAC$ and $AD \parallel BC$.



From figure,

$$\angle 1 = \angle 2 \quad [\text{AD is a bisector of } \angle \text{EAC}]$$

$$\angle 1 = \angle 3 \quad [\text{Corresponding angles}]$$

$$\text{and } \angle 2 = \angle 4 \quad [\text{alternative angle}]$$

From above, we have $\angle 3 = \angle 4$

This implies, $AB = AC$

Two sides AB and AC are equal.

$\Rightarrow \Delta ABC$ is an isosceles triangle.

Question 3: In an isosceles triangle, if the vertex angle is twice the sum of the base angles, calculate the angles of the triangle.

Solution:

Let ΔABC be isosceles where $AB = AC$ and $\angle B = \angle C$

Given: Vertex angle A is twice the sum of the base angles B and C. i.e., $\angle A = 2(\angle B + \angle C)$

$$\angle A = 2(\angle B + \angle B)$$

$$\angle A = 2(2 \angle B)$$

$$\angle A = 4(\angle B)$$

Solutions for Class 9 Maths Chapter 10 Congruent Triangles

Now, We know that sum of angles in a triangle = 180°

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

$$4 \angle B + \angle B + \angle B = 180^\circ$$

$$6 \angle B = 180^\circ$$

$$\angle B = 30^\circ$$

Since, $\angle B = \angle C$

$$\angle B = \angle C = 30^\circ$$

And $\angle A = 4 \angle B$

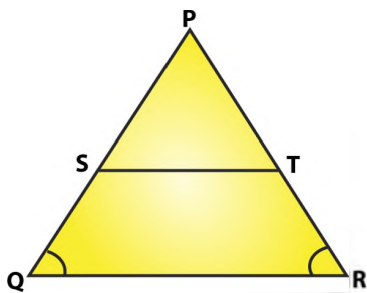
$$\angle A = 4 \times 30^\circ = 120^\circ$$

Therefore, angles of the given triangle are 30° and 30° and 120° .

Question 4: PQR is a triangle in which $PQ = PR$ and S is any point on the side PQ. Through S, a line is drawn parallel to QR and intersecting PR at T. Prove that $PS = PT$.

Solution: Given that PQR is a triangle such that $PQ = PR$ and S is any point on the side PQ and $ST \parallel QR$.

To prove: $PS = PT$



Since, $PQ = PR$, so $\triangle PQR$ is an isosceles triangle.

$$\angle PQR = \angle PRQ$$

Now, $\angle PST = \angle PQR$ and $\angle PTS = \angle PRQ$

[Corresponding angles as ST parallel to QR]

Solutions for Class 9 Maths Chapter 10 Congruent Triangles

Since, $\angle PQR = \angle PRQ$

$\angle PST = \angle PTS$

In ΔPST ,

$\angle PST = \angle PTS$

ΔPST is an isosceles triangle.

Therefore, $PS = PT$.

Hence proved.