# Chapter-Triangles

## 1. Similarity of Triangles

Two triangles are similar if their corresponding angles are equal and the ratios of corresponding sides are equal.

Example 1:

In triangles ABC and PQR, if $\angle A = \angle P$, $\angle B = \angle Q$, and $AB/PQ = BC/QR$, prove that the triangles are similar.

Solution:

Given: $\angle A = \angle P$, $\angle B = \angle Q$, and $AB/PQ = BC/QR$

Since two angles are equal, the third angles $\angle C$ and $\angle R$ must also be equal.

With all angles equal and one pair of sides in proportion, the triangles are similar by the AAA similarity criterion.

Example 2:

In triangle ABC, DE is parallel to BC. If AD = 3 cm, DB = 2 cm, and AE = 2.4 cm, find EC.

Solution:

By the theorem on the line parallel to one side of a triangle, we have:

AD/DB = AE/EC

3/2 = 2.4/EC

EC = (2 × 2.4) / 3 = 1.6 cm

## 2. Similarity Criteria for Triangles

a) AAA (Angle-Angle-Angle) Criterion

b) SAS (Side-Angle-Side) Similarity Criterion

c) SSS (Side-Side-Side) Similarity Criterion

Example 1:

In triangles ABC and DEF, $\angle A = \angle D = 50°$, $\angle B = \angle E = 70°$. Are the triangles similar?

Solution:

Given: $\angle A = \angle D = 50°$, $\angle B = \angle E = 70°$

Since the sum of angles in a triangle is 180°, the third angles must also be equal:

$\angle C = \angle F = 60°$

By the AAA similarity criterion, the triangles are similar.

Example 2:

In triangles PQR and XYZ, $PQ/XY = QR/YZ = 3/4$ and $\angle PQR = \angle XYZ$. Are the triangles similar?

## Solution:

Given: PQ/XY = QR/YZ = 3/4 and $\angle PQR = \angle XYZ$

We have two pairs of sides proportional and the included angle equal.

By the SAS similarity criterion, the triangles are similar.