

# Similar Triangles

By [BrushMyQuant](#)



YouTube Video Link to this Post is [Here](#)

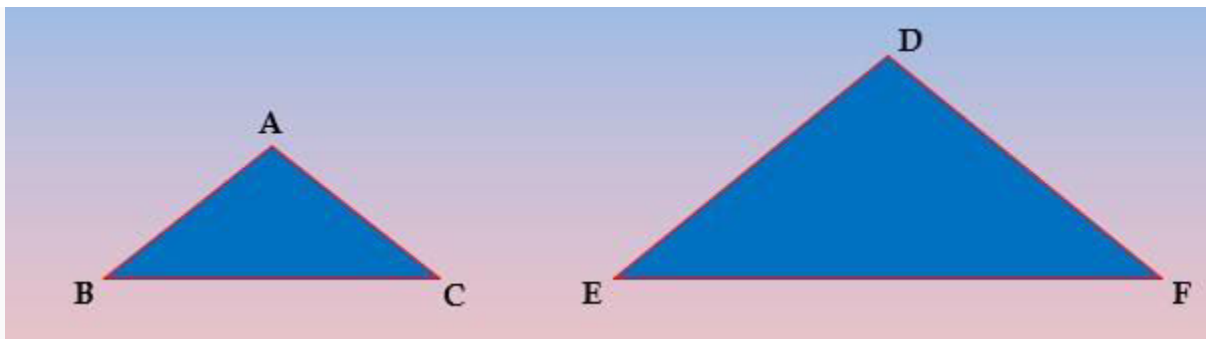
Following is covered in the video

- ▣ Definition of Similar Triangles
- ▣ Properties of Similar Triangles
- ▣ Relationship of Perimeter of two Similar Triangles
- ▣ Relationship of Area of two Similar Triangles

## Definition of Similar Triangles

**Two triangles are similar if at least two of their corresponding angles are equal.**

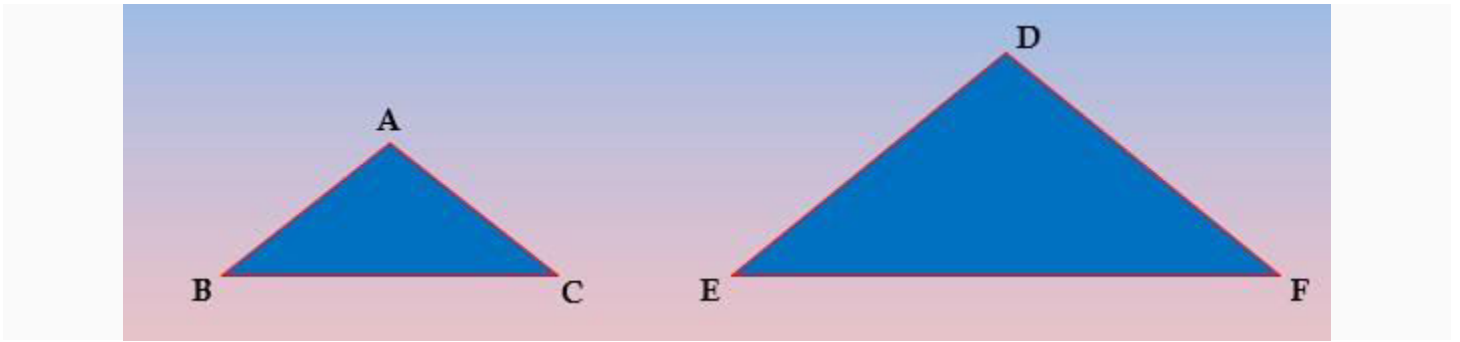
- => If two angles are equal then the third angle will also be equal (As sum of the angles is  $180^\circ$ )
- => If all three corresponding angles of two triangles are equal then they are similar triangles



In above Figure  $\triangle ABC$  and  $\triangle DEF$  are similar because  $\angle A = \angle D$ ,  $\angle B = \angle E$  and  $\angle C = \angle F$

## Properties of Similar Triangles

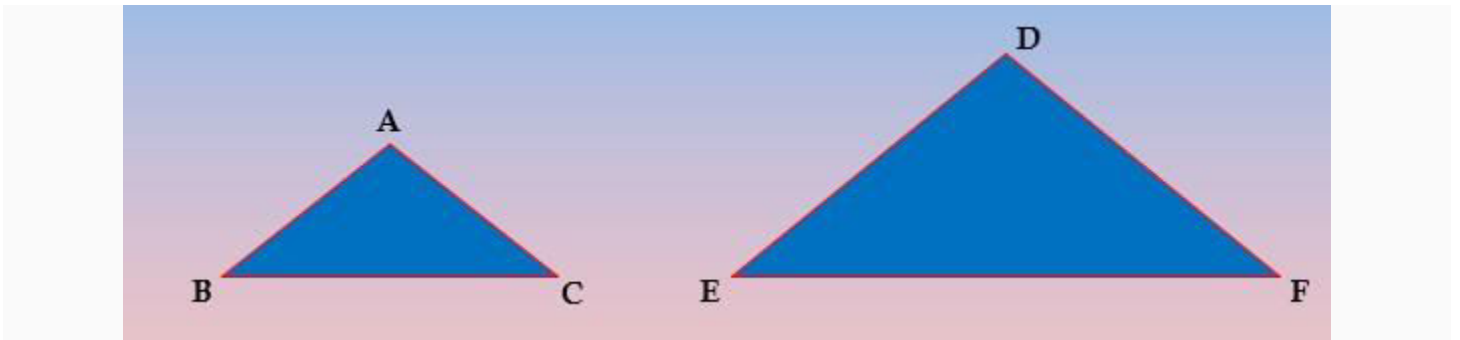
**If two triangles are similar, then their corresponding sides will be in the same ratio.**



In above Figure  $\triangle ABC$  and  $\triangle DEF$  are similar  
 $\Rightarrow AB/DE = BC/EF = AC/DF$

## Relationship of Perimeter of two Similar Triangles

**Ratio of Perimeter of two similar triangles is equal to the ratio of their sides.**

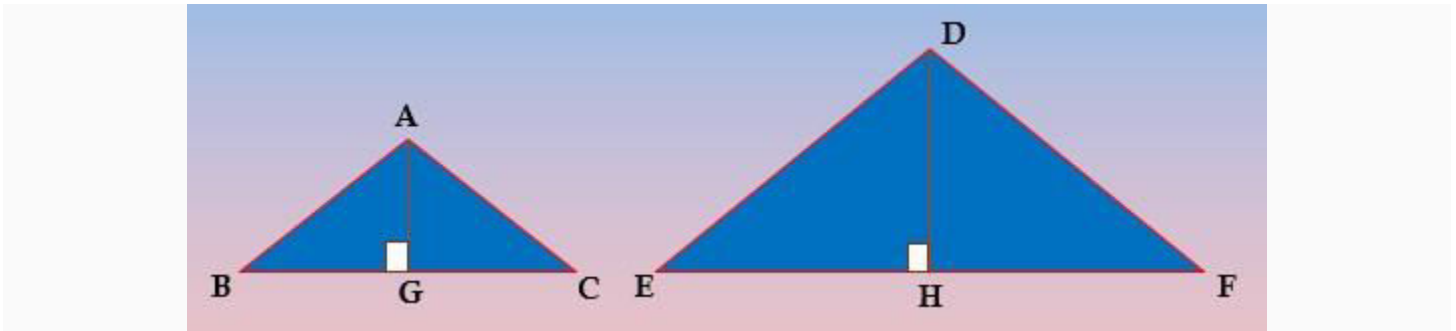


In above Figure  $\triangle ABC$  and  $\triangle DEF$  are similar  
 $\Rightarrow AB/DE = BC/EF = AC/DF = k$  (assume)  
 $\Rightarrow AB = k*DE$   
 $\Rightarrow BC = k*EF$   
 $\Rightarrow AC = k*DF$

$\Rightarrow \text{Perimeter of } \triangle ABC / \text{Perimeter of } \triangle DEF = (AB+BC+AC) / (DE+EF+DF) = (k*DE + k*EF + k*DF) / (DE+EF+DF)$   
 $= k*(DE+EF+DF) / (DE+EF+DF) = k = AB/DE = BC/EF = AC/DF$

### Relationship of Area of two Similar Triangles

**Ratio of Area of two similar triangles is equal to square of ratio of their sides.**



In above Figure  $\triangle ABC$  and  $\triangle DEF$  are similar and  $AG$  is perpendicular( $\perp$ ) to  $BC$  and  $DH \perp EF$

If we consider  $\triangle AGB$  and  $\triangle DHE$ , then  $\angle B = \angle E$ ,  $\angle G = \angle H = 90^\circ \Rightarrow \angle GAB = \angle HDE$

$\Rightarrow \triangle AGB$  and  $\triangle DHE$

$\Rightarrow$  Their sides will be in the same ratio

$\Rightarrow AG/DH = GB/HE = AB/DE \dots(1)$

And we already know that  $\triangle ABC$  and  $\triangle DEF$

$\Rightarrow AB/DE = BC/EF = AC/DF = k \dots(2)$

From (1) and (2) we get

$AG/DH = GB/HE = AB/DE = AC/DF = k$

$\Rightarrow \text{Area of } \triangle ABC / \text{Area of } \triangle DEF = (1/2 * BC * AG) / (1/2 * EF * DH) = (BC*AG) / (EF*DH)$

$= BC/EF * AG/DH = k * k = k^2$

Hope it helps!

Good Luck!