CHAPTER 06

Triangles

Introduction:

Two figures are said to be congruent, if they have the same shape and the same size.

If there are two triangles ABC and DEF, such that

AB = DE

BC = EF

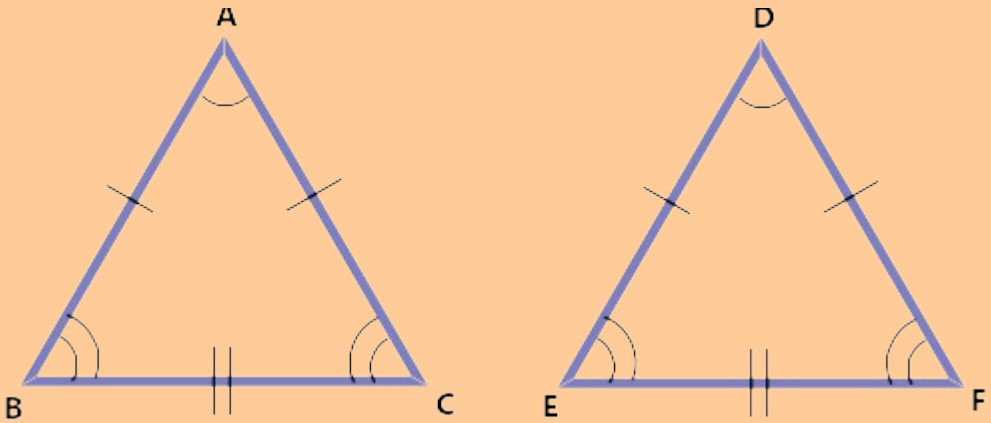
AC = DF

(And)

$\angle A = \angle D$

$\angle B = \angle E$

$\angle C = \angle F$

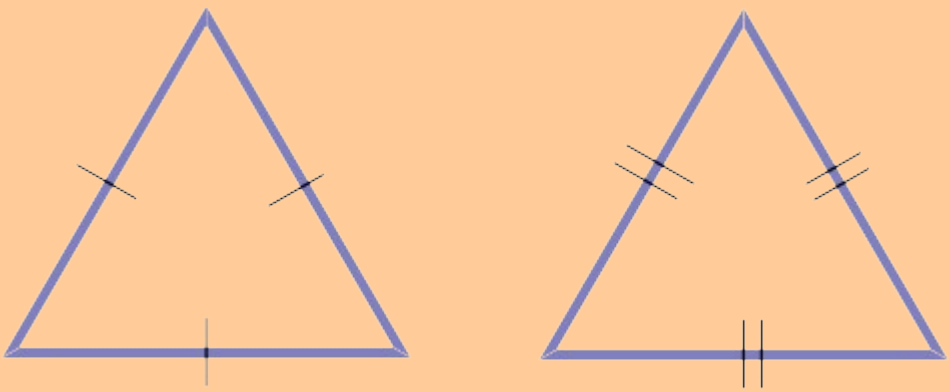


Then these two triangles are congruent to each other. Then when we can say that, two figures are said to be similar to each other?

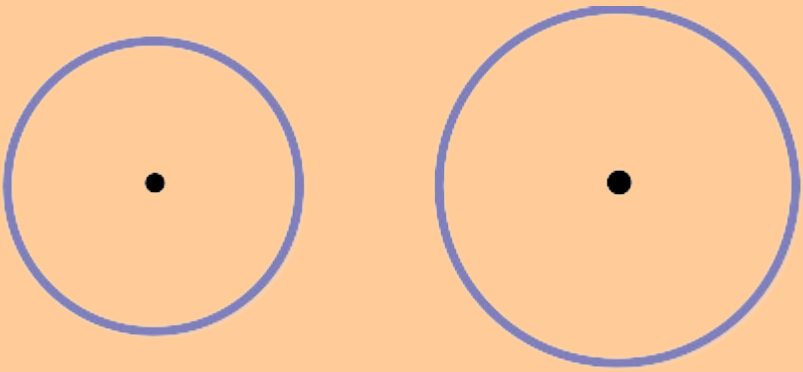
Two figures are said to be similar, if they have same shape but not necessarily the same size.

Example,

Any two equilateral triangles are similar.



- Any two circles are similar.



- Any two-line segments are similar.

Here, we can notice that,

All congruent figures are always similar but all similar figures need not be congruent figures always.

Similarity of polygons:

Polygon:

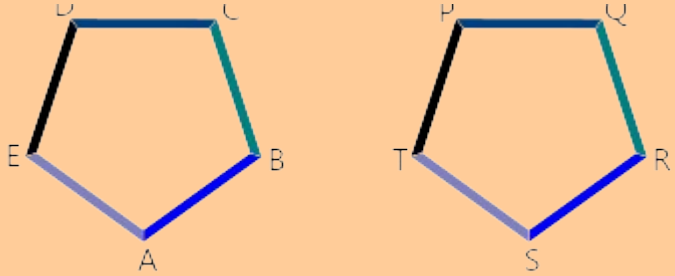
A closed plane figure with at least three straight sides and three angles is called polygon.

Two polygons of same number of sides are similar.

If, their of corresponding sides are proportional and their corresponding angles are equal.

Example:

If two polygons ABCDE and PQRST are similar then,



- **Ratio of corresponding sides:**

$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CD}{RS} = \frac{DE}{ST} = \frac{EA}{TP}$$

- **Corresponding angles:**

$\angle A = \angle P$

$\angle B = \angle Q$

$\angle C = \angle R$

$\angle D = \angle S$

$\angle E = \angle T$

$\therefore$ We can say that, polygons ABCDE and PQRST are similar to each other.

Ratio of corresponding sides are proportional to each other.

Proportion:

If the ratio of two quantities are equal, then they are said to be in proportion.

We can express it as,

a : b = p : q (OR) $\frac{a}{b} = \frac{p}{q}$

Scalar factor:

The ratio of the measurements of corresponding sides of two similar polygons is called the scalar factor or representative fraction.

Similarity of two triangles:

You may recall that triangle is also a polygon. We can state the same conditions for the similarity of two triangles.

i.e.

Their corresponding sides are proportional to each other and their corresponding angles are equal.

Example:

If two triangles ΔABC and ΔDEF are similar.

If $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

(And)

$\angle A = \angle D$

$\angle B = \angle E$

$\angle C = \angle F$