# CONSTRUCTIONS

**Key Points**

1. Division of a line segment in the given ratio.

2. Construction of triangles:-

   a. When three sides are given.
   b. When two sides and included angle given.
   c. When two angles and one side given.
   d. Construction of a right angled triangle.

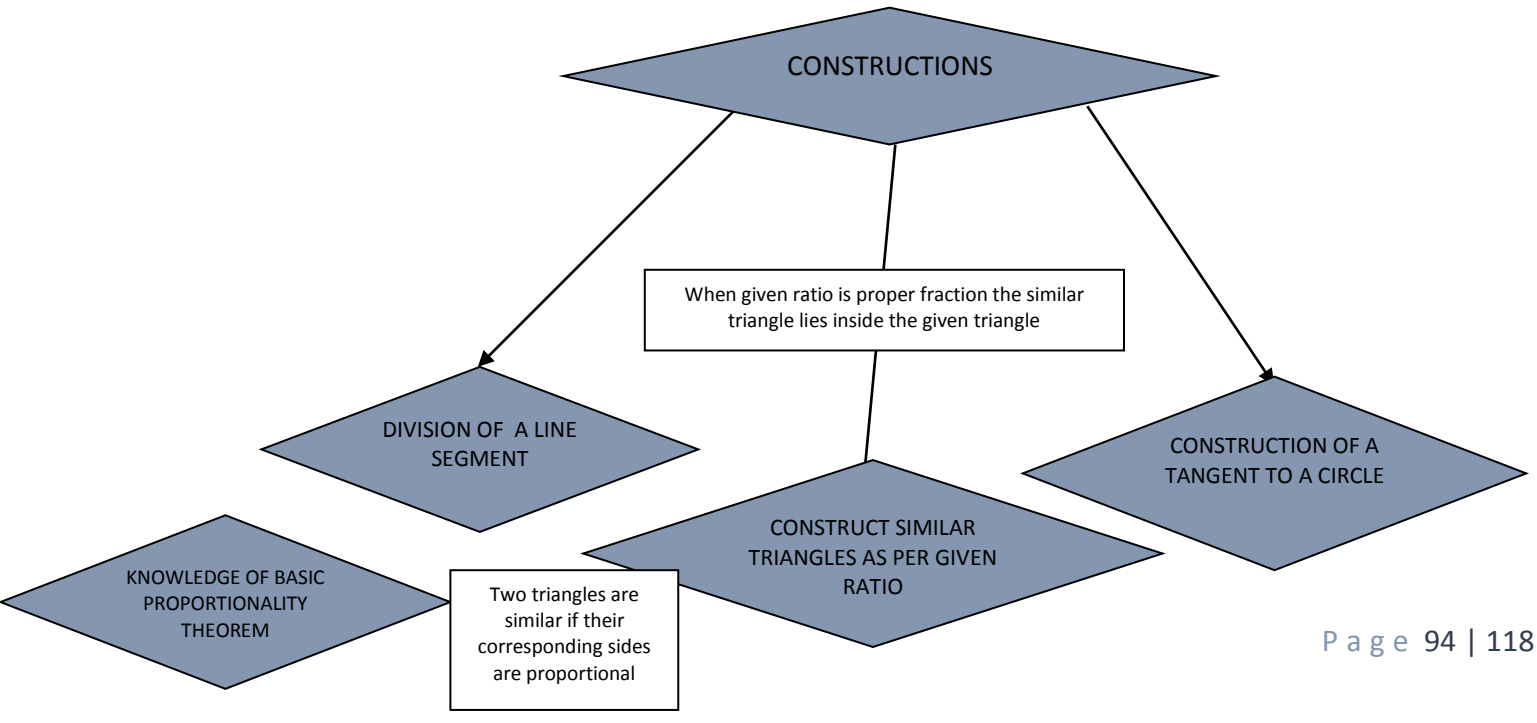
3. Construction of triangle similar to a given triangle as per given scale factor.

4. Construction of tangents to a circle.

**EXPECTED LEARNING OUTCOMES**

1. Correct use of Mathematical instruments.
2. Drawing a line segment and an angle as per the given data.
3. To divide the given line segment in the given ratio accurately.
4. Neatness and accuracy in drawing.
5. The concept of similar triangles.
6. To Construct a triangle as per the conditions given.
7. To construct similar triangle to a given triangle as per the given ratio.
8. To know that when the ratio is a proper fraction then the similar triangle lies inside the given Triangle and when improper then the similar triangle lies outside the given triangle.
9. To construct tangents to a circle from an external point given.

**CONCEPT MAP**



## LEVEL – I

**1.** Draw a line segment AB=8cm and divide it in the ratio 4:3.

**2.** Divide a line segment of 7cm internally in the ratio 2:3.

**3.** Draw a circle of radius 4 cm. Take a point P on it. Draw tangent to the given circle at P.

**4.** Construct an isosceles triangle whose base is 7.5 cm and altitude is 4.2 cm.

**5.** Draw a line segment of length 9 cm. and divide it in seven equal parts.

## LEVEL –II

**1.** Construct a triangle of sides 4cm, 5cm and 6cm and then a triangle similar to it whose sides are 2/3 of the corresponding sides of the first triangle. (CBSE 2013)

**2.** Construct a triangle similar to a given ΔABC such that each of its sides is $2/3^{rd}$ of the corresponding sides of ΔABC. It is given that AB=5cm BC=6cm and AC=7cm. Also write the steps of construction.

**3.** Draw a pair of tangents to a circle of radius 4cm, which are inclined to each other at an angle of $60^0$. (CBSE 2013)

**4.** Draw a circle of radius 5cm. From a point 8cm away from its centre construct the pair of tangents to the circle and measure their lengths.

**5.** Construct a triangle PQR in which QR=6cm, $\angle Q=60^0$ and $\angle R=45^0$. Construct another triangle similar to ΔPQR such that its sides are 5/6 of the corresponding sides of ΔPQR.

**6.** Draw a line segment AB= 7.5cm and locate a point P on AB such that AP= 3/7 AB. Give justification of the construction.

## LEVEL-III

1. Draw a circle with centre O and radius 3.5cm. Take a horizontal diameter. Extend it to both sides to point P and Q such that OP=OQ=7cm. Draw tangents PA and QB, one above the diameter and the other below the diameter. Is PA||BQ.
2. Construct a Δ ABC in which AB = 6 cm, ∠A = 30° and ∠B = 60°. Construct another ΔAB'C' similar to ΔABC with base AB' = 8 cm. (CBSE 2015)
3. Draw a right triangle ABC in which $\angle B=90^0$, AB=5cm, BC=4cm, then construct another triangle A'BC' whose sides are 5/3 times the corresponding sides of ΔABC. Is the new triangle also a right triangle?
4. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.
5. Draw a line segment AB of length 7 cm. Using ruler and compasses, find a point P on AB such that AP/AB = 3/5. (CBSE 2011)
6. Construct an isosceles triangle whose base is 8 cm. and altitude 4 cm. and then construct another triangle whose sides are ¾ times the corresponding sides of the isosceles triangle. (CBSE 2011)
7. ABC is a right triangle in which AB=5.4 cm, BC= 7 cm and $\angle B = 90^0$.Draw BD perpendicular on AC and a circle through B, C, D. Construct a pair of tangents from A to this circle.
8. Construct a triangle ABC in which AB=5cm,$\angle B=60^0$and altitude CD=3 cm. Construct a triangle PQR similar to ΔABC such that each side of ΔPQR is 1.5 times that of the corresponding sides of ΔABC.
9. Construct a tangent to a circle of radius 3.5 from a point on the concentric circle of radius 6.5 cm and measure its length. Also, verify the measurement by actual calculation.

## Self-Evaluation

**1.**Draw a line segment of length 7 cm. Find a point P on it which divides it in the ratio 3:5.

**2**. Draw an isosceles triangle ABC in which AB=AC=6 cm and BC=5 cm. Construct a triangle PQR similar to ΔABC in which PQ=8 cm. Also justify the construction.

**3.**Two line segments AB and AC include an angle of $60^0$where AB=5 cm and AC=7 CM. Locate points P and Q on AB and AC respectively such that AP=3/4 AB and AQ=1/4 AC. Join P and Q and measure the length PQ.

**4.** Draw a triangle ABC in which AB=4 cm, BC=6 cm and AC=9 cm. Construct a triangle similar to ΔABC with scale factor 3/2. Justify your construction.

**5.**Draw a pair of tangents to a circle of radius 4.5 cm, which are inclined to each other at an angle of $45^0$.

**6.**Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre another circle of radius 2.5 cm. Construct tangents to each circle from the centre of the other circle.

## Value Based Question

**(1)** Two trees are to be planted at two positions A and B in the middle of a park and the third tree is to be planted at a position C in such a way that AC: BC= 3:4. How it can be done? What value is indicated from the above action?

**(2)** Draw a circle of radius 5 cm. Draw tangents from the end points of its diameter. What do you observe?