Constructions Worksheet

# Problem – 1.

Is construction of a triangle with sides 6 cm, 3 cm, 3 cm possible?

# Problem – 2.

Is construction of a triangle with sides 8 cm, 4 cm, 5 cm possible?

# Problem – 3.

To divide the line segment *AB* in the ratio 4 : 5, draw a ray *AX* such that  $\angle BAX$  is an acute angle, then draw a ray *BY* parallel to *AX* and the point  $A_1, A_2, A_3, \ldots$  and  $B_1, B_2, B_3, \ldots$  are located at equal distances on ray *AX* and *BY* respectively. Then which points should be joined?

# Problem – 4.

Given a triangle with side  $AB = 8 \ cm$ . In what ratio will line segment AB be divided to get a line segment  $AB' = \frac{3}{4}$  of AB?

# Problem – 5.

By geometrical construction, it is possible to divide a line segment in the ratio  $\sqrt{3}:\frac{1}{\sqrt{3}}$ . Is it true?

# Problem – 6.

To draw a pair of tangents to a circle which are inclined to each other at an angle of 60°, it is required to draw tangents at end points of those two radii of the circle. What should be the angle between them?

# Problem – 7.

Divide a line segment AB = 6 cm in the ratio 3:2.

# Problem – 8.

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

# Problem – 9.

Construct a triangle with sides 5 cm, 6 cm and cm and then another triangle whose sides are  $\frac{7}{5}$  of the corresponding sides of the first triangle.

#### Problem – 10.

Construct an isosceles triangle whose base is cm and altitude is 5 cm. Then construct another triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the first isosceles triangle.

# Problem – 11.

Construct a  $\triangle ABC$  in which CA = 6cm, AB = 5cm and  $\angle BAC = 45^{\circ}$ , then construct a triangle similar to the given triangle whose sides are  $\frac{6}{5}$  of the corresponding sides of the  $\triangle ABC$ .

# Problem – 12.

Draw an equilateral triangle of height 4.5 cm. Draw another triangle similar to it such that its side is  $\frac{2}{3}$  of the side of the first.

# Problem – 13.

Draw a circle of radius 6 cm. From a point cm away from its centre, construct the pair of tangents to the circle.

### Problem – 14.

Draw a circle of radius 4.5 cm. At a point P on it, draw a tangent to the circle without using the centre.

# Problem – 15.

Construct a tangent to a circle of radius 4 cm from a point which is at a distance of 6 cm from its centre.

# Problem – 16.

Draw a circle of diameter 7.2 cm. Then draw two tangents to the circle from a point P at a distance 7.2 cm from the centre of the circle.

# **Problem – 17.**

Draw a circle of radius 3.4 cm. Draw two tangents to it inclined at an angle of  $60^{\circ}$  to each other.

#### Problem – 18.

Draw a triangle ABC with side BC = 7cm,  $\angle B = 45^{\circ}$ ,  $\angle A = 105^{\circ}$ . Then, construct a triangle whose sides are  $\frac{4}{3}$  times the corresponding sides of  $\triangle ABC$ . Also, justify the construction.

# Problem – 19.

Construct a triangle ABC with side BC = 7cm,  $\angle B = 60^{\circ}$  and AB = 6 cm. Construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of  $\triangle ABC$ . Also, justify the construction.

## Problem – 20.

Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then, construct another triangle whose sides are  $\frac{5}{3}$  times the corresponding sides of the given triangle.

# Problem – 21.

Draw a triangle ABC in which AB = 4 cm, BC = 6 cm and AC = 9 cm. Construct a triangle similar to  $\triangle ABC$  with scale factor  $\frac{3}{2}$ . Justify the construction. Are the two triangles congruent? Note that all the three angles and two sides of the two triangles are equal.

# Problem – 22.

Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60°. Also, justify the construction. Measure the distance between the centre of the circle and the point of intersection of tangents.

# Problem – 23.

Draw a circle with the help of a bangle. Take a point outside the circle. Construct the pair of tangents from this point to the circle.

# Problem – 24.

Draw two concentric circles of radii 3 cm and 5 cm. Construct a tangent to smaller circle from a point on the larger circle. Also measure its length.

# Problem – 25.

ABC be a right triangle in which AB = 3 cm, BC = 4 cm and  $\angle B = 90^{\circ}$ . BD is the perpendicular from B on AC. The circle through B, C and D is drawn. Construct the tangents from A to this circle.

# Problem – 26.

Given a rhombus *ABCD* in which AB = 4 cm and  $\angle ABC = 60^{\circ}$ , divide it into two triangles say,  $\triangle ABC$  and  $\triangle ADC$ . Construct the triangle *AB*'*C*' similar to  $\triangle ABC$  with scale factor  $\frac{2}{3}$ . Draw a line segment *CD*' parallel to *CD* where *D*' lies on *AD*. Is *AB*'*C*'*D*' a rhombus? Give reasons.

# Problem – 27.

Draw a parallelogram *ABCD* in which BC = 5cm, AB = 3cm and  $\angle ABC = 60^{\circ}$ , divide it into triangles *BCD* and *ABD* by the diagonal *BD*. Construct the triangle *BD*'C' similar to  $\triangle BDC$  with scale factor  $\frac{4}{3}$ . Draw the line segment *D*'A' parallel to *DA*, where A' lies on extended side *BA*. Is *A'BC'D*' a parallelogram?

#### Problem – 28.

Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are  $\frac{2}{3}$  of the corresponding sides of the first triangle. Also, justify the construction. **Sol.** 

# Problem – 29.

Two line segments *AB* and *AC* include an angle of 60°, where AB = 5cm and AC = 7cm. Locate points *P* and *Q* on *AB* and *AC*, respectively such that  $AP = \frac{3}{4}AB$  and  $AQ = \frac{1}{4}AC$ . Join *P* and *Q* and measure the length *PQ*. **Sol.** 

### Problem – 30.

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

## Problem – 31.

Draw a triangle *ABC* in which BC = 5.4 cm,  $\angle B = 45^{\circ}$  and  $\angle A = 115^{\circ}$ . Now, construct a triangle similar to triangle *ABC* each of whose sides is  $\frac{5}{3}$  of the corresponding sides of triangle *ABC*. **Sol.** 

# Problem – 32.

Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.