Short Answer Type Questions – I & II
[2 and 3 marks]

Que 1. 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.

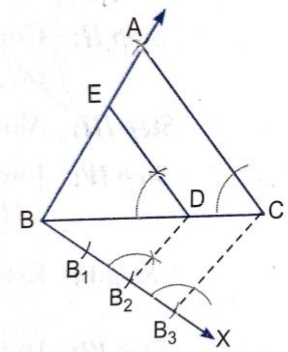

Fig. 9.3

Sol. Steps of construction:
Step I: Draw a line segment BC = 6 cm.
Step II: Draw an arc with B as centre and radius equal to 5 cm.
Step III: Draw an arc, with C as centre and radius equal to 4 cm intersecting the previous drawn arc at A.
Step IV: Join AB and AC, then ΔABC is the required triangle.
Step V: Below BC, make an acute angle CBX.
Step VI: Along BX, mark off three points at equal distance:

$B_1, B_2, B_3, such\ that\ BB_1 = B_1B_2 = B_2B_3.$

Step VII: Join B_3 C.
Step VIII: From B_2, draw $B_2D \parallel B_3C$, meeting BC at D.
Step IX: From D, draw ED || AC, meeting BA at E. Then we have ΔEDB which is the required triangle.

Justification:
Since DE || CA

$$\therefore \quad \Delta ABC \sim \Delta EBD \quad and \quad \frac{EB}{AB} = \frac{BD}{BC} = \frac{DW}{CA} = \frac{2}{3}$$

Hence, we have the new ΔEBD similar to the given $\Delta ABC,$ whose sides are equal to $\frac{2}{3}$ rd of the corresponding sides ofΔABC.

Que 2. Draw a line segment of length 7.6 cm and divides it in the ratio 5: 8. Measure the two parts.

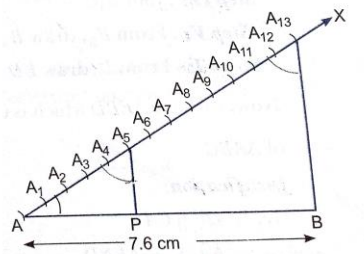

Fig. 9.4

Sol. Steps of construction:

Step I: Draw a line segment AB = 7.6 cm

step II: Draw any ray AX making an acute angle $\angle BAX$ with AB.

Step III: On ray AX, starting from A, mark 5 + 8 = 13 equal arcs.

$AA_1, A_1A_2, A_2A_3, A_3A_4, \ldots A_{11}A_{12}\ and\ A_{12}A_{13}$.

Step IV: Join A_{13} B.

Step V: From A_5, draw A_5 P || A_{13} B, meeting B at P.

Thus, P divides AB in the ratio 5: 8. On measuring the two parts. We find AP = 2.9 cm and PB = 4.7 (approx.).

Justification:

In $\Delta ABA_{13,}$ PA || BA_{13}

∴ By Basic proportionality theorem

$$\frac{AP}{PB} = \frac{AA_5}{A_5A_{13}} = \frac{5}{8}$$

$$\Rightarrow \quad \frac{AP}{PB} = \frac{5}{8} \qquad \therefore \quad AP: PB = 5: 8$$

Que 3. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then draw another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

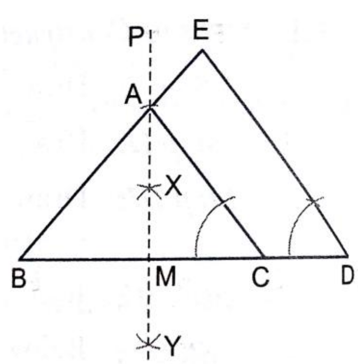

Fig. 9.5

Sol. Steps of construction:

Step I: Draw BC = 8 cm.

Step II: Construct XY, the perpendicular bisector of line segment BC, meeting BC at M.

Step III: Along MP, cut-off MA = 4 cm.

Step IV: Join BA and CA, Then ΔABC so obtained is the required ΔABC.

Step V: Extend BC to D, such that BD = 12 cm $\left(= \frac{3}{2} \times 8\ cm\right)$.

Step VI: Draw DE || CA, meeting BA produced at E. Then ΔEBD is the required triangle.

Justification:

Since, DE || CA

$$\therefore \quad \Delta ABC \sim \Delta EBD \quad and \quad \frac{EB}{AB} = \frac{DE}{CA} = \frac{BD}{BC} = \frac{12}{8} = \frac{3}{2}$$

Hence, we have the new triangle similar to the given triangle whose are $1\frac{1}{2}\ i.e., \frac{3}{2}$ times the corresponding sides of the isosceles ΔABC.

Que 4. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4} th$ of the corresponding sides of the triangle ABC.

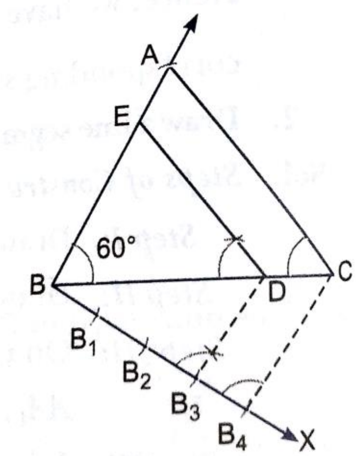

Fig. 9.6

Sol. Steps of construction:

Step I: Construct a ΔABC in which BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$.

Step II: Below BC, make an acute $\angle CBX$.

Step III: Along BX, mark off four arcs:

B_1, B_2, B_3 *and* B_4 such that

$BB_1 = B_1B_2 = B_2B_3 = B_3B_4$.

Step IV: Join B_4 C.

Step V: From B_3, draw B_3 D || B_4 C, meeting BC at D.

Step VI: From D, draw ED || AC. Meeting BA at E.

Now, we have ΔEBD which is the required triangle whose sides are $\frac{3}{4}th$ of the corresponding sides of ΔABC.

Justification:
Here, DE || CA
∴ $\Delta ABC \sim \Delta EBD$

And $\frac{EB}{AB} = \frac{BD}{BC} = \frac{DE}{CA} = \frac{3}{4}$

Hence, we get the new triangle similar to the given triangle whose sides are equal to $\frac{3}{4}th$ of the corresponding sides of ΔABC.

Que 5. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

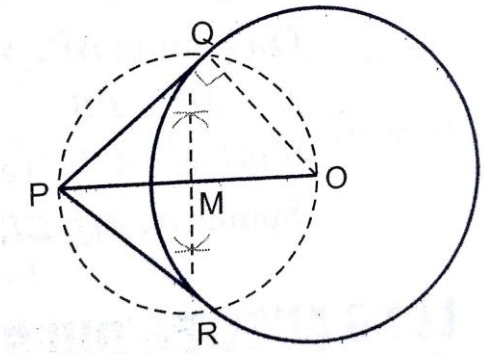

Fig. 9.7

Sol. Steps of construction:
Step I: Take a point O and draw a circle of radius 6 cm.
Step II: Take a point P at a distance of 10 cm from the centre O.
Step III: Join OP and bisect it. Let M be the mid-point.
Step IV: With M as centre and MP as radius, draw a circle to intersect the circle at Q and R.
Step V: Join PQ and PR. Then, PQ and PR are the required tangents. On measuring, we find, PQ = PR = 8 cm.

Justification:
On joining OQ, we find that $\angle PQO = 90°$, as $\angle PQO$ is the angle in the semicircle.
∴ $PQ \perp OQ$
Since OQ is the radius of the given circle, so PQ has to be a tangent to the circle.
Similarly, PR is also a tangent to the circle.