Short Answer Type Questions – I

[2 marks]

Que 1. In triangle PQR and TSM, ∠P = 55°, ∠Q = 25°, ∠M = 100° and ∠S = 25°. Is ΔQPR ~ ΔTSM? Why?

Sol. Since, $\angle R = 180° - (\angle P + \angle Q)$

$= 180° - (55° + 25) = 100° = \angle M$

∠Q = ∠S = 25° (Given)

ΔQPR ~ ΔSTM

i.e., ΔQPR is not similar to ΔTSM.

Que 2. If ABC and DEF are similar triangles such that $\angle A = 47°$ and $\angle E = 63°$, then the measures of $\angle C = 70°$. Is it true? Give reason.

Sol. Since ΔABC ~ ΔDEF

$\therefore \quad \angle A = \angle D = 47°$

$\angle B = \angle E = 63°$

$\therefore \quad \angle C = 180° - (\angle A + \angle B) = 180° - (47° + 63°) = 70°$

∴ Given statement is true.

Que 3. Let ΔABC ~ ΔDEF and their areas be respectively 64 cm² and 121 cm². If EF = 15.4 cm, find BC.

Sol. We have, $\frac{area\ of\ \Delta ABC}{area\ of\ \Delta DEF} = \frac{BC^2}{EF^2}$ (as ΔABC ~ ΔDEF)

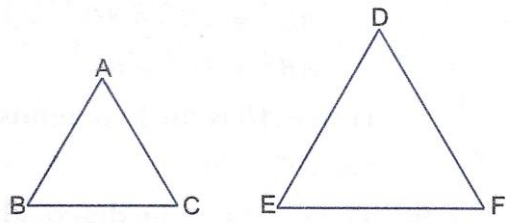

Fig. 7.5

$\Rightarrow \quad \frac{64}{121} = \frac{BC^2}{EF^2} \Rightarrow \frac{64}{121} = \frac{BC^2}{(15.4)^2}$

$\Rightarrow \quad \frac{BC}{15.4} = \frac{8}{11}$

$\therefore \quad BC = \frac{8}{11} \times 15.4 = 11.2\ cm$

Que 4. ABC is an isosceles triangle right-angled at C. Prove that AB² = 2AC².

Sol. ΔABC is right-angled at C.

$\therefore$ $AB^2 = AC^2 + BC^2$ [By Pythagoras theorem]

$\Rightarrow$ $AB^2 = AC^2 + AC^2$ [$\because$ AC = BC]

$\Rightarrow$ $AB^2 = 2AC^2$

Que 5. Sides of triangle are given below. Determine which of them are right triangles. In case of a right triangle, write the lenght of its hypotenuse.
(i) 7 cm, 24 cm, 25 cm **(ii) 3 cm, 8 cm, 6 cm**

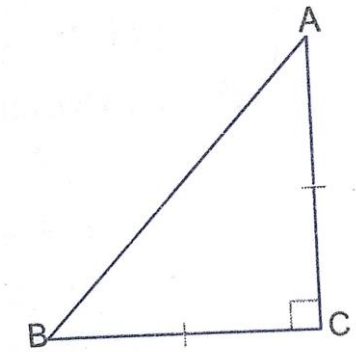

Fig. 7.6

Sol. (i) Let a = 7cm, b = 24 cm and c = 25 cm.
Here, largest side, c = 25 cm
We have, $a^2 + b^2 = (7)^2 + (24)^2 = 49 + 5769 = 625 = c^2$ [$\because$ $c = 25$]

So, the triangle is a right triangle.
Hence, c is the hypotenuse of right triangle.

(ii) Let a = 3 cm, b = 8 cm and c = 6 cm
Here, largest side, b = 8 cm
We have, $a^2 + c^2 = (3)^2 + (6)^2 = 9 + 36 = 45 \neq b^2$
So, the triangle is not a right triangle.

Que 6. If triangle ABC is similar to triangle DEF such that 2AB = DE and BC = 8 cm. Then find the length of EF.

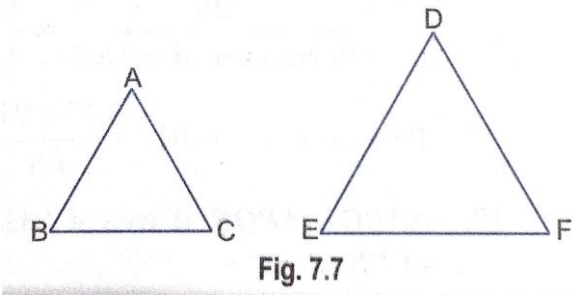

Fig. 7.7

Sol. ΔABC ~ ΔDEF (Given)

$\therefore \quad \frac{AB}{DE} = \frac{BC}{EF}$

$\frac{AB}{2AB} = \frac{8}{EF} \qquad (\because\ DE = 2AB)$

$\frac{1}{2} = \frac{8}{EF}$

$\therefore$ EF = 16 cm

Que 7. If the ratio of the perimeter of two similar triangles is 4: 25, then find the ratio of the similar triangles.

Sol. $\because$ Ratio of perimeter of 2 $\Delta's = 4: 25$
Ratio of corresponding sides of the two $\Delta's = 4: 25$

Now, The ratio of area of 2 $\Delta's$ = Ratio of square of its corresponding sides.

$$= \frac{(4)^2}{(25)^2} = \frac{16}{625}$$

Que 8. In an isosceles ΔABC, if AC = BC and $AB^2 = 2AC^2$ then find $\angle C$.

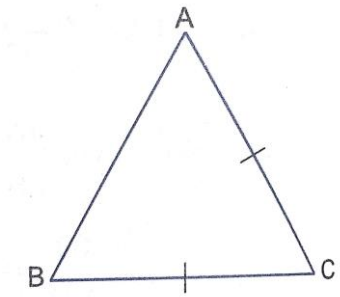

Fig. 7.8

Sol. $AB^2 = 2AC^2$ (Given)
$AB^2 = AC^2 + AC^2$
$AB^2 = AC^2 + BC^2$ ($\because$ AC = BC)
Hence AB is the hypotenuse and ΔABC is a right angle Δ.
So, $\angle C = 90°$

Que 9. The length of the diagonals of a rhombus are 16 cm and. Find the length of side of the rhombus.

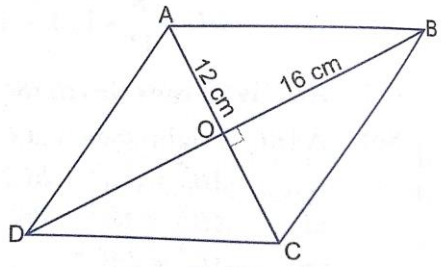

Fig. 7.9

Sol. ∵ The diagonals of rhombus bisect each other at 90 °.

∴ In the right angle ΔBOC

BO = 8 cm

CO = 6 cm

∴ By Pythagoras Theorem

$BC^2 = BO^2 + CO^2 = 64 + 36$

$BC^2 = 100$

BC = 10 cm

Que 10. A man goes 24 m towards West and then 10 m towards North. How far is he from the starting point?

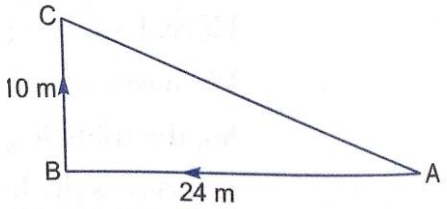

Fig. 7.10

Sol. By Pythagoras Theorem

$AC^2 = AB^2 + BC^2 = (24)^2 + (10)^2$

$AC^2 = 676$

AC = 26 m

∴ The man is 26 m away from the starting point.

Que 11. ΔABC ~ ΔDEF such that AB = 9.1 cm and DE = 6.5 cm. If the perimeter of ΔDEF is 25 cm, what is the perimeter of ΔABC?

Sol. Since ΔABC ~ ΔDEF

$$\frac{Perimeter\ of\ \Delta DEF}{Perimeter\ of\ \Delta ABC} = \frac{DE}{AE}$$

$$\frac{25}{Perimeter\ of\ \Delta ABC} = \frac{6.5}{9.1}$$

Perimeter of ΔABC = $\frac{25 \times 91}{65}$ = 35 cm

Que 12. Δ**ABC** $\sim$ Δ**PQR; if area of** Δ**ABC = 81 cm^2, area of** Δ**PQR = 169 cm^2 and AC = 7.2 cm, find the length of PR.**

Sol. Since $\Delta ABC \sim \Delta PQR$

$$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{AC^2}{PR^2} \qquad \Rightarrow \qquad \frac{81}{169} = \frac{(7.2)^2}{PR^2}$$

$$\Rightarrow \qquad PR^2 = \frac{(7.2)^2 \times 169}{81}$$

Taking square root both the sides

$$PR = \frac{7.2 \times 13}{9} = \frac{72 \times 13}{10 \times 9} = \frac{104}{10} = 10.4\ cm.$$