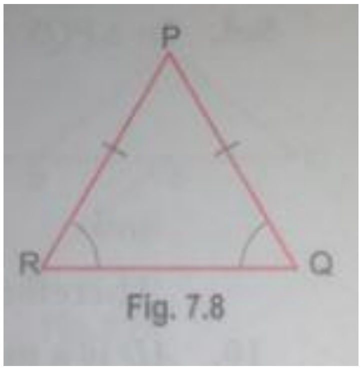
Short Answer Type Questions – I

[2 MARKS]

Que 1. In Fig. 7.8, $\Delta PQR, PQ = PR$ and $\angle Q = 65^0$. Then find $\angle R$.



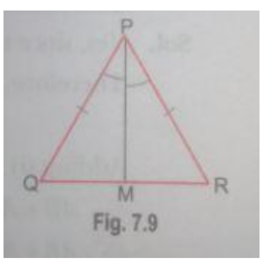
Sol. **In** $\Delta\text{PQR}, \text{PQ} = \text{PR},$ So $\angle Q = 65^0 = \angle R$

[Angles opposite to equal sides of a triangle are equal.]

Que 2. If the corresponding angles of two triangles are equal, then they are always congruent. State true or false and justify your answer.

Sol. False, because two equilateral triangles with sides 3 cm and 6 cm respectively have all angles equal, but the triangles are not congruent.

Que 3. In the Fig. 7.9, PM is the bisector of $\angle P$ and $PQ = PR$. Then ΔPQM and ΔPRM are congruent by which criterion?



Sol. In ΔPQM and ΔPRM

$PQ = PR$ and $\angle QPM = \angle RPM$ (Given)

PM is common.

So, $\Delta PQM \cong \Delta\text{PQM}$ (By SAS rule)

Que 4. In Fig. 7.10 $\Delta\ PQR$, if $\angle Q = 40^0$ and $\angle R = 72^0$, then find the shortest and the largest sides of the triangle.

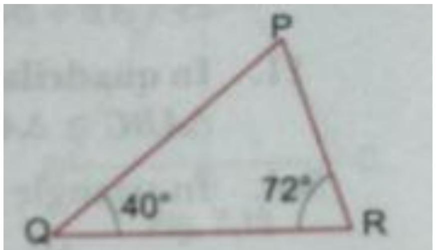


Fig. 7.10

Sol. In ΔPQR, we know

$\angle Q = 40^0$ and $\angle R = 72^0$

Then, $\angle P = 180^0 - (72^0 + 40^0) = 68^0$

In ΔPQR,

PQ is largest side [Because side opposite to largest angle is largest]

PR is shortest side [Because side opposite to shortest angle is shortest]

Que 5. In Fig. 7.11, if AB = AC and BD = DC, then find $\angle ADB$.

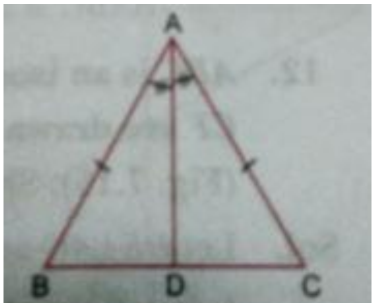


Fig. 7.11

Sol. ΔADB and ΔADC

$AB = AC, BD = DC$ [Given]

$AD = AD$ [Common]

So, $\Delta ADB \cong \Delta ADC$ [By SSS congruence rule]

$\Rightarrow$ $\angle ADB = \angle ADC$ [CPCT]

But $\angle ADB + \angle ADC = 180^0$ [Linear pair]

$\Rightarrow$ $\angle ADB + \angle ADB = 180^0$

$\Rightarrow \qquad 2\angle ADB = 180^0 \Rightarrow \angle ADB = 90^0$

Que 6. Is it possible to construct a triangle with lengths of its sides 5cm, 3cm and 8cm? Give reason for your answer.

Sol. No, since sum of two sides is equal to third side. (5 cm + cm = 8 cm)

Que 7. Is it possible to construct a triangle with lengths of its sides as 7 cm, 8 cm and 5 cm? Give reason for your answer.

Sol. Yes, because in each case sum of two sides is greater than the third side.

Que 8. In ΔABC, $\angle A = 65^0$ and $\angle C = 30^0$. Which side of this triangle is the longest? Give reason for your answer.

Sol. $\angle B = 180^0 - 65^0 - 30^0 = 85^0$

$\because AC$ is the longest side as side opposite to the larger angle is longer.

Que 9. In Fig. 7.12, $PQ = PR$ and $\angle Q = \angle R$. Prove that $\Delta PQS \cong \Delta PRT$.

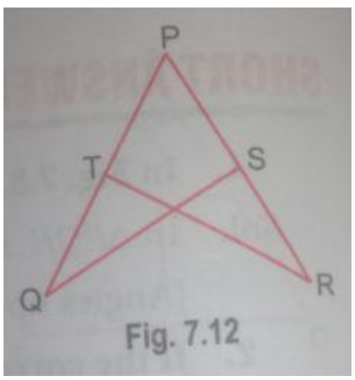


Fig. 7.12

Sol. In ΔPQS and ΔPRT

$PQ = PR$ (Given)

$\angle Q = \angle R$ (Given)

And $\angle P = \angle P$ (Common)

Therefore $\Delta PQS \cong \Delta \mathrm{PRT}$ (ASA Congruence criterion)

Que 10. AD is a median of the $\Delta ABC (Fig. 7.13)$. Is it true that $AB + BC + CA > 2AD$? Give reason for your answer.

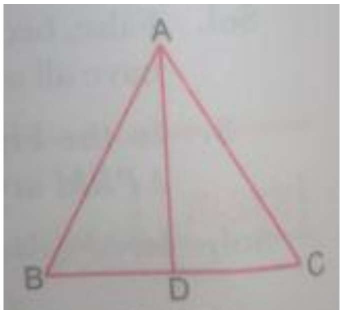


Fig. 7.13

Sol. Yes, since the sum of two sides of a triangle is greater than the third side.

Therefore, $AB + BD > AD$ …(i)

$AC + CD > AD$ …(ii)

Adding (i) and (ii), we get

$$AB + AC + (BD + CD) > AD + AD$$

$$\Rightarrow \; AB + BC + CA > 2AD$$

Que 11. In quadrilateral $ACBD, AC = AD$ and AB bisects $\angle A$ (in Fig.7.14). Show that $\Delta ABC \cong \Delta ABD$. What can you say about BC and BD?

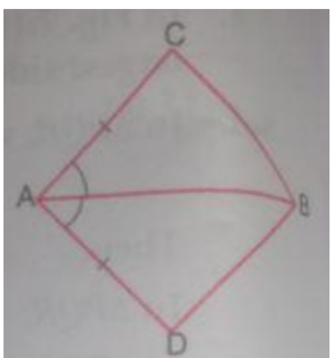


Fig. 7.14

Sol. In triangle ABC and ABD, we have,

$AC = AD$ (Given)

$\angle CAB = \angle BAD$ ($\therefore$ AB bisects $\angle A$)

$AB = AB$ (Common)

And by SAS congruence criterion, we have

$\Delta ABC \cong \Delta ABD \quad \Rightarrow BC = BD \quad (CPCT)$

Que 12. ABC is an isosceles triangle in which altitude BE and CF are drawn to equal sides AC and AB respectively (Fig.7.15). Show that these altitudes are equal.

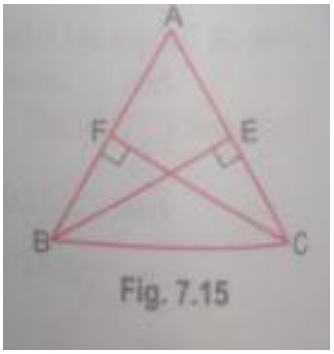


Fig. 7.15

Sol. Let $BE \perp AC$ and $CF \perp AB$.

In triangles ABE and ACF, we have

$\angle AEB = \angle AFC$ (∵ Each 90^0)

$\angle A = \angle A$ (Common)

And $AB = AC$ (Given)

By AAS criterion of congruence, we have

$\Delta ABE \cong \Delta ACF$

So, $BE = CF$ $(CPCT)$

Que 13. In Fig. (7.16) $ABCD$ is a square and P is the midpoint of AD. BP and CP are joined. Prove that $\angle PCB = \angle PBC$.

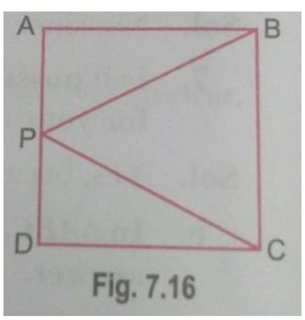


Fig. 7.16

Sol. In triangles PAB and PDC,

$PA = PD$ (Given

$AB = CD$ (Side of square)

$\angle PAB = \angle PDC = 90^0$ (By RHS, $\Delta PAB \cong \Delta$PDC

∴ $PC = PB \Rightarrow \angle PCB = \angle PBC$