

### Exercise 7.3

3) Given,

$$AB = PQ,$$

$$BG = QR \text{ and}$$

$$AM = PN$$

$$\therefore \frac{1}{2} BG = BM \text{ and } \frac{1}{2} QR = QN$$

$$\text{Also, } BG = QR$$

$$\text{So, } \frac{1}{2} BG = \frac{1}{2} QR$$

$$\Rightarrow BM = QN$$

In  $\triangle ABM$  and  $\triangle PQN$ ,

$$AM = PN \text{ and } AB = PQ$$

$$BM = QN$$

$\therefore \triangle ABM \cong \triangle PQN$  by SSS congruency

ii- In  $\triangle ABG$  and  $\triangle PQR$

$$AB = PQ \text{ and } BG = QR$$

$$\angle ABG = \angle PQR \text{ (by CPCT)}$$

So,  $\triangle ABG \cong \triangle PQR$  by SAS congruency

4) It is known that BE and CF are two equal altitudes.

Now, in  $\triangle BEC$  and  $\triangle CFB$ ,

$$\angle BEC = \angle CFB = 90^\circ$$

$$BC = CB$$

$$BE = CF$$

So,  $\triangle BGC \cong \triangle CGB$  by RHS

Also,  $C = B$

Therefore,  $AB = AC$  as side opposite to equal angles is always equal.

5) In the question, it is given that  $AB = AC$   
Now,  $\triangle ABP$  and  $\triangle ACP$  are similar by  
RHS

$$\angle APB = \angle APC = 90^\circ$$

$$AB = AC$$

$$AP = AP$$

So,  $\triangle ABP \cong \triangle ACP$

$\therefore B = C$  by CPCT