Solution For School Geometry Problems

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Ques. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of $\triangle$ PQR.Show that:

(a) $\triangle$ ABM $\cong$ $\triangle$ PQN

(b) $\triangle$ ABC $\cong$ $\triangle$ PQR

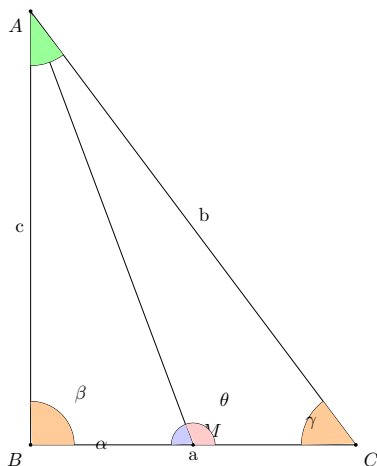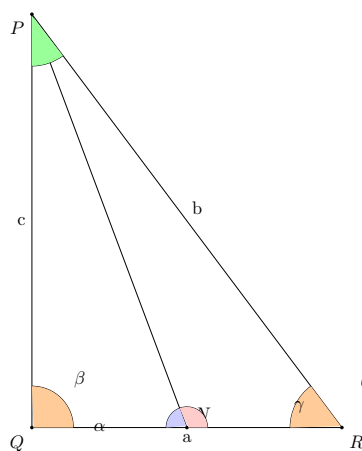**Ans.** (a) Let assume we have two triangles as follows→

Figure 1: $\triangle$ ABC

Figure 2: $\triangle$ PQR

given that →

$$AB = PQ \tag{1}$$
$$AM = PN \tag{2}$$
$$BC = QR \tag{3}$$

from equation (3)...

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$$\frac{BC}{2} = \frac{QR}{2} \tag{4}$$

$$BM = QN \tag{5}$$

from fig [1] and [2] ...

$$AB = PQ \tag{6}$$

$$AM = PN \tag{7}$$

$$BM = QN \tag{8}$$

$$\implies \Delta ABM \cong \Delta PQN \tag{9}$$

(b) given that $\rightarrow$

$$AM = PN \tag{10}$$

from equation (3)...

$$\frac{BC}{2} = \frac{QR}{2} \tag{11}$$

$$MC = NR \tag{12}$$

from equation (9)...

$$\Delta ABM \cong \Delta PQN \tag{13}$$

$$\implies \angle AMB = \angle PNQ \tag{14}$$

$$180 - \angle AMB = 180 - \angle PNQ \tag{15}$$

$$\angle AMC = \angle PNR \tag{16}$$

from equation (10),(12) and (16)...

$$AM = PN \tag{17}$$

$$MC = NR \tag{18}$$

$$\angle AMC = \angle PNR \tag{19}$$

$$\implies \Delta AMC \cong \Delta PNR \tag{20}$$

$$\implies AC = PR \tag{21}$$

from equation (1),(3) and (21)...

$$AB = PQ \tag{22}$$

$$BC = QR \tag{23}$$

$$AC = QR \tag{24}$$

$$\implies \Delta ABC \cong \Delta PQR \tag{25}$$