Solution For School Geometry Problems

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Question

1. **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:**

   1. $\triangle$ ABM $\cong$ $\triangle$ PQN
   2. $\triangle$ ABC $\cong$ $\triangle$ PQR

Figures

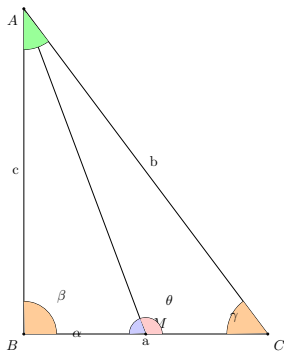Let assume we have two triangles as follows$\rightarrow$
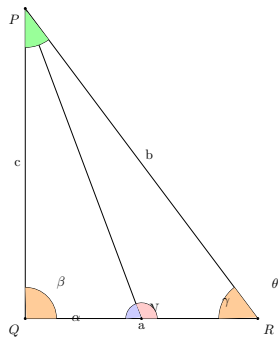

Figure: a

Figure: b

Codes

latex codes for figures a and b

./figures/congurentpicabc2.pdf
./figures/congurentpicabc.pdf

python codes for figures a and b

./codes/congurenttriangle.py
../codes/congurenttriangle2.py

Ans.1

given that $\rightarrow$

$$AB = PQ \qquad (1)$$
$$AM = PN \qquad (2)$$
$$BC = QR \qquad (3)$$

from equation (3)...

$$\frac{BC}{2} = \frac{QR}{2} \qquad (4)$$
$$BM = QN \qquad (5)$$

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

$$AB = PQ \quad (6)$$
$$AM = PN \quad (7)$$
$$BM = QN \quad (8)$$
$$\implies \Delta ABM \cong \Delta PQN \quad (9)$$

Ans.2

given that $\rightarrow$

$$AM = PN \qquad (10)$$

from equation (3)...

$$\frac{BC}{2} = \frac{QR}{2} \qquad (11)$$
$$MC = NR \qquad (12)$$

from equation (9)...

$$\Delta ABM \cong \Delta PQN \qquad (13)$$
$$\implies \angle AMB = \angle PNQ \qquad (14)$$
$$180 - \angle AMB = 180 - \angle PNQ \qquad (15)$$
$$\angle AMC = \angle PNR \qquad (16)$$

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

$$AM = PN \quad (17)$$
$$MC = NR \quad (18)$$
$$\angle AMC = \angle PNR \quad (19)$$
$$\implies \Delta AMC \cong \Delta PNR \quad (20)$$
$$\implies AC = PR \quad (21)$$

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

$$AB = PQ \quad (22)$$
$$BC = QR \quad (23)$$
$$AC = QR \quad (24)$$
$$\implies \Delta ABC \cong \Delta PQR \quad (25)$$