ASSIGNMENT 1

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PROBLEM

Exercise 8.1, Q36

The side 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) $\triangle ABC \cong \triangle PQR$

CODES

Download the python code from

./codes/triangle_python.py

latex-tikz code from

./fig/triangle.tex

The above latex code can be compiled as a standalone document using

./fig/triangle_fig.tex

FIGURES

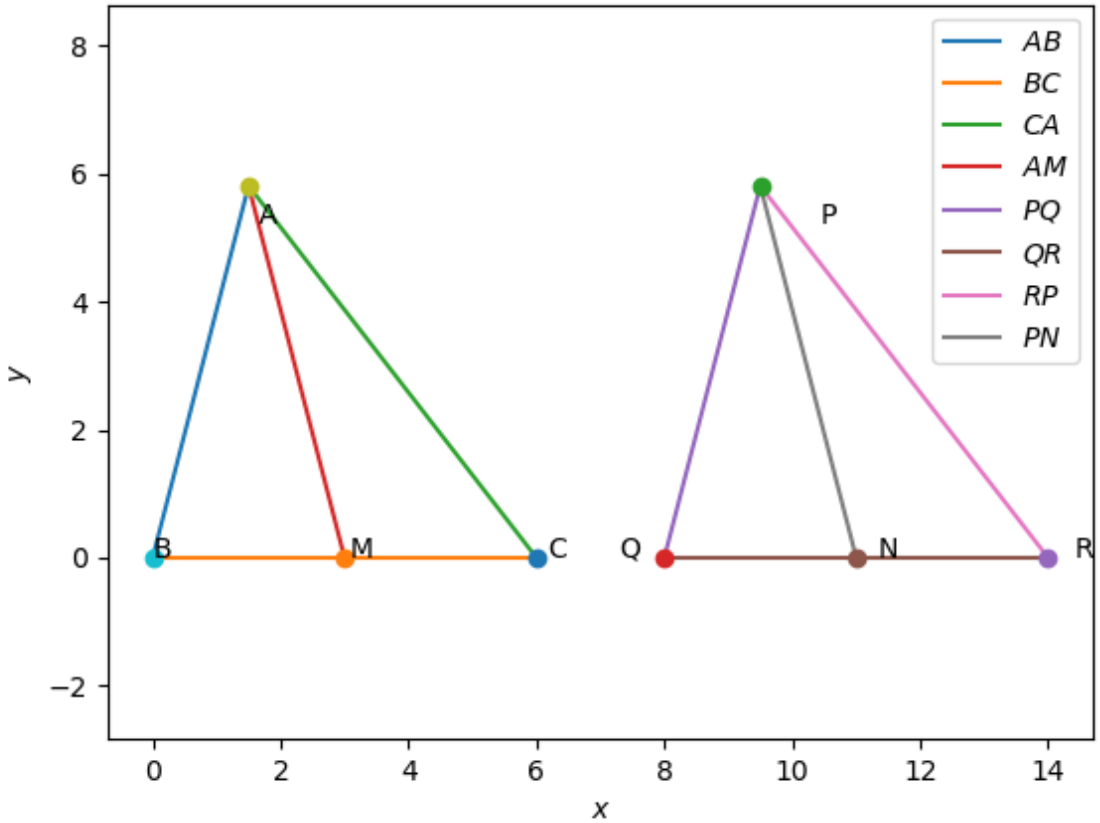

Figure: $\triangle ABC$ and $\triangle PQR$ using Python

FIGURES

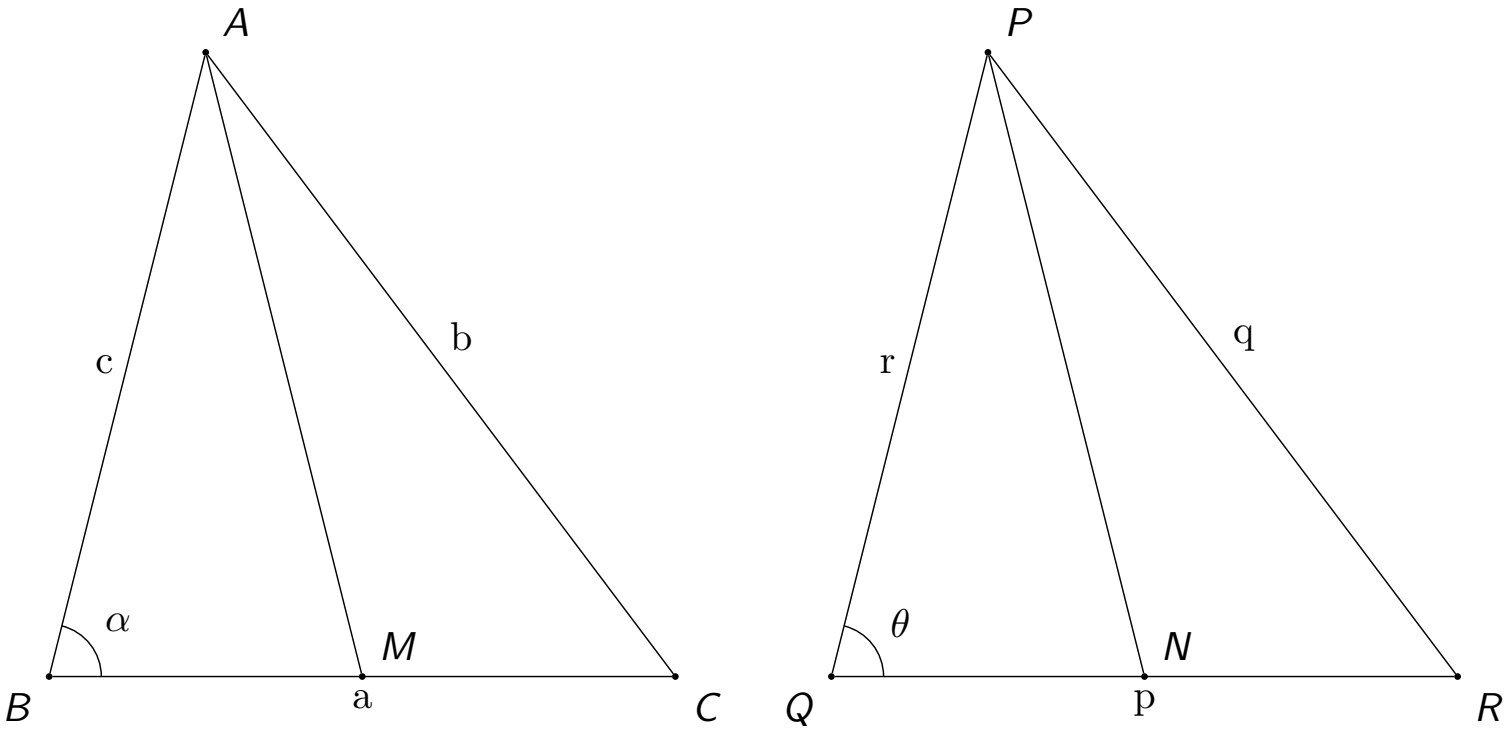

Figure: $\triangle ABC$ and $\triangle PQR$ using Latex

CONSTRUCTION

The following values are used to construct above given figures:

Input Values	
a,p	6
c,r	6
median (AM,PN)	6

Table: To construct $\triangle ABC and \triangle PQR$

The steps for constructing $\triangle ABC$ are

$$(i)\vec{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} (ii)\vec{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}$$

Since, $\vec{M}$ is the midpoint of $\vec{BC}$

$$\vec{M} = (1/2)(\vec{B} + \vec{C}); \vec{M} = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$$

Derived Values for $\triangle ABC$.	
	Coordinates
$\vec{M}$	$\begin{pmatrix} 3 \\ 0 \end{pmatrix}$
$\vec{A}$	$\begin{pmatrix} 1.5 \\ 5.81 \end{pmatrix}$

Table: To construct $\triangle ABC$

Using the similar steps as $\triangle ABC$, we can construct $\triangle PQR$ because they both have the same input parameters.

SOLUTION

1) In triangle ABM and triangle PQN

AB = PQ (Given)
AM = PN (Given)
Since BC = QR and M , N are midpoints of BC and QR respectively,
BM = QN
Therefore by SSS congruence rule, $\triangle ABM \cong \triangle PQN$

This implies that $\angle ABM = \angle PQN$ .....(i)

SOLUTION

2) In triangle ABC and triangle PQR

AB = PQ (Given)
$\angle ABC = \angle PQR$ [From (i)]
BC = QR (Given)

Therefore by SAS congruence rule, $\triangle ABC \cong \triangle PQR$

The End