MATRICES USING PYTHON

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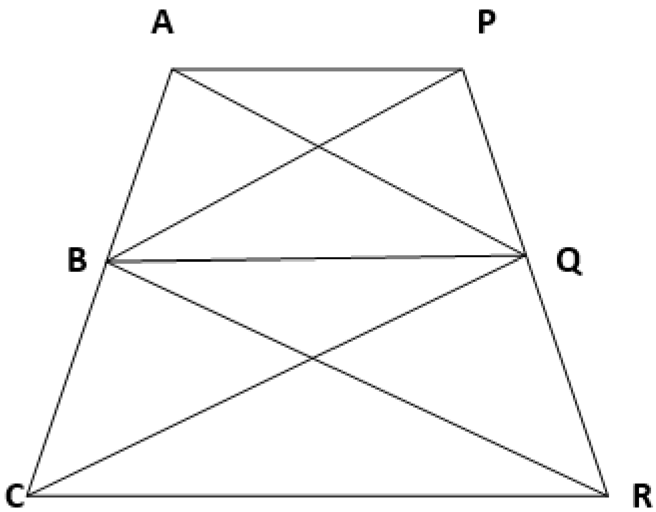
FWC22036 IITH Future Wireless Communication (FWC) ASSIGN-4

Contents

1 Problem

Given $AP \,||\, BQ \,||CR$. Prove that
ar(AQC)= ar(PBR)



2 Solution

Theory:
Given $AP \,||\, BQ \,||CR$
To Prove: Ar(AQC)=Ar(PBR)
Δ BQA and Δ BQP lies on same base and are between same parallel BQ and AP
$\therefore$ Ar(Δ BQA)=Ar(Δ BQP)......(1)
Theorem : Two triangles on the same base (or equal bases) and between the same parallels are equal in area.

$\therefore$ Ar(Δ BQC)=Ar(Δ BQR)......(2)

To Prove: Ar(AQC)=Ar(PBR)
Add (1) to (2)
Ar(ΔBQA)+Ar(BQC)=Ar(ΔBQP)+Ar(BQR)

$\therefore$ Ar(AQC)=Ar(PBR)
Hence, Proved

1 Termux commands :

```
python3 matrixline.py
```

The input parameters for this construction are

Symbol	Value	Description
k	1	AB
c	8	CA
a	12	CR
p2	4	AP
θ	$\pi/3$	$\angle$AC
C	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	Point C

To Prove: Ar(AQC)=Ar(PBR)

v1=A-C
v2=A-Q

Area of the triangle ΔAQC is given by
Ar(ΔAQC) $=\frac{1}{2}\|\vec{v1} \times \vec{v2}\|$............(2)

v3=R-P
v4=R-B

Area of the triangle ΔPBR is given by
Ar(ΔPBR) $=\frac{1}{2}\|\vec{v3} \times \vec{v4}\|$...............(3)

$\therefore$ Ar(AQC)=Ar(PBR)

The below python code realizes the above construction:

https://github.com/KrishnaYadati/Assignments/tree/main/Matrix-line_assignment/line_program

3 Construction

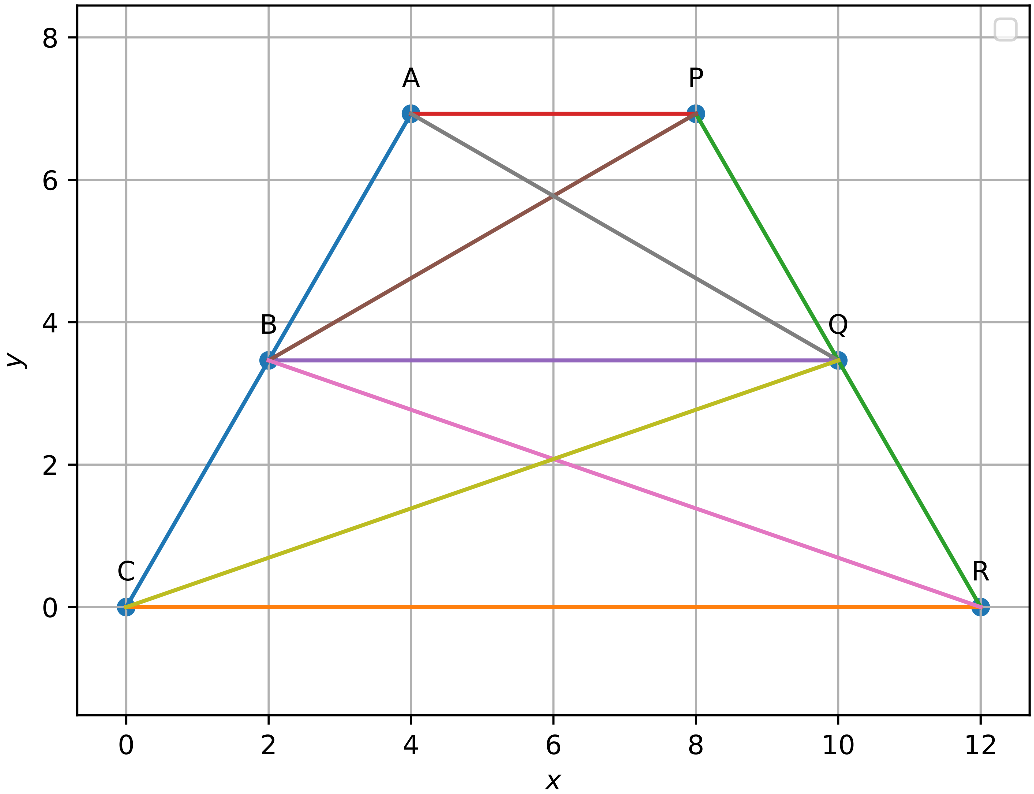


Figure of Construction