

MATRICES USING PYTHON

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IITH Future Wireless Communication (FWC)

ASSIGN-4

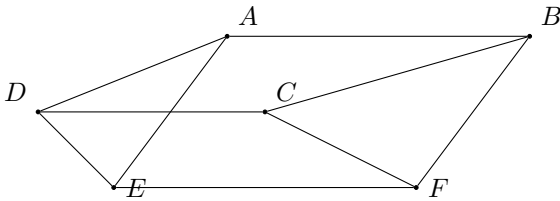
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$\therefore EA = FB$
 $\therefore \Delta ADE = \Delta BCF$
Hence, Proved

1 Problem

ABCD, DCFE and ABFE are parallelograms. Show that $ar(ADE) = ar(BCF)$.



Theory:

Parallelograms on the same base and in between the same parallels are equal in area. Given: ABCD, DCFE and ABFE are parallelograms.

2 Solution

To Prove: $Ar(ADE) = Ar(BCF)$

parallelogram ABCD lies between same parallel lines AD and BC

$$\therefore AD = BC \dots (1)$$

parallelogram DECF lies between same parallel lines DE and CF

$$\therefore DE = CF \dots (2)$$

parallelogram ABEF lies between same parallel lines AE and FB

$$\therefore EA = FB$$

In ΔADE , ΔBCF

$$\therefore AD = BC$$

$$\therefore DE = CF$$

Termux commands :

`python3 matrixline.py`

The input parameters for this construction are

Symbol	Value	Description
a	4.5	EA
b	4.5	BC
c	10	CD
d	2.5	DE
θ_1	$25\pi/180$	$\angle BC$
θ_2	$120\pi/180$	$\angle DE$
θ_3	$2\pi/3$	$\angle AE$
θ_4	$35\pi/180$	$\angle CD$
E	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	Point E

To Prove:

$$Ar(ADE) = Ar(BCF)$$

$$v_1 = A-D$$

$$v_2 = D-E$$

Area of the triangle ΔADE is given by

$$Ar(\Delta ADE) = \frac{1}{2} \|v_1 \times v_2\| \dots (2)$$

$$v_3 = B-C$$

$$v_4 = C-F$$

Area of the triangle ΔBCF is given by

$$Ar(\Delta BCF) = \frac{1}{2} \|v_3 \times v_4\| \dots (3)$$

$$\therefore Ar(ADE) = Ar(BCF)$$

The below python code realizes the above construction:

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

3 Construction

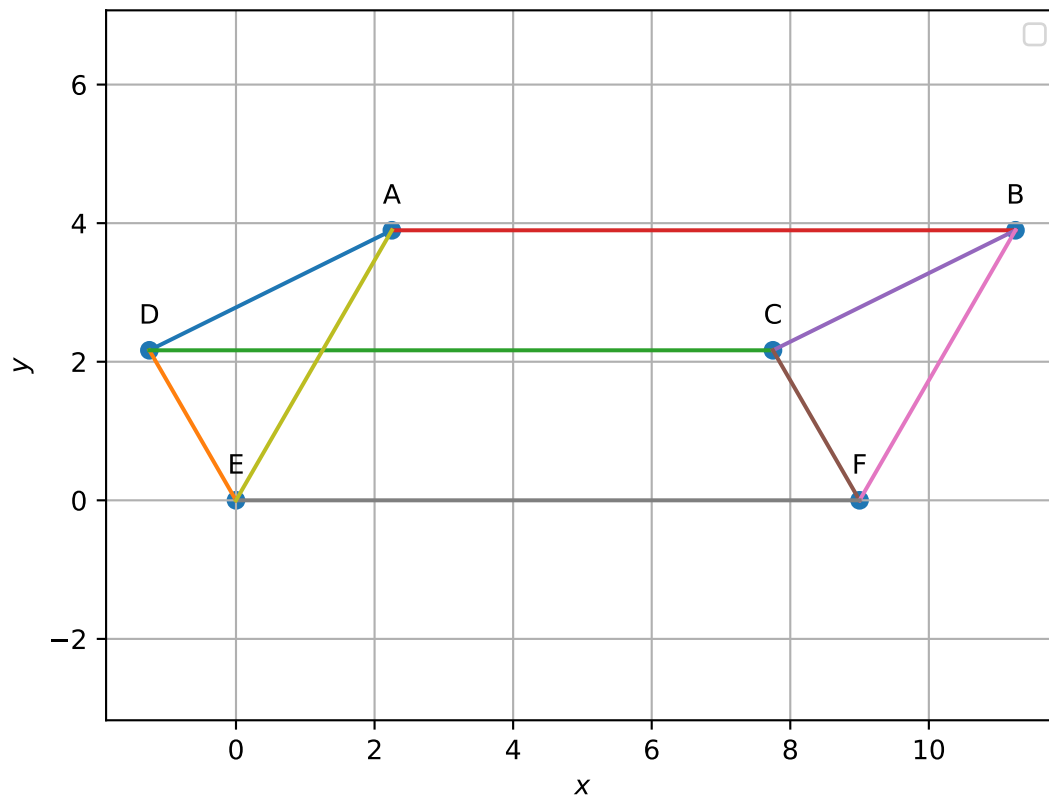


Figure of Construction