

Assignment 3

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1 PROBLEM 1

[https://github.com/gadepall/ncert/blob/main/linalg/construction/gvv ncert constr.pdf](https://github.com/gadepall/ncert/blob/main/linalg/construction/gvv%20ncert%20constr.pdf) Q.no.2.8

construct a quadrilateral MIST where $MI = 3.5$, $IS = 6.5$, $\angle M = 75^\circ$, $\angle I = 105^\circ$ and $\angle S = 120^\circ$. Can you construct the quadrilateral MIST if $\angle M = 100^\circ$ instead of 75° ?

2 SOLUTION

The basic property of quadrilateral is that-

Lemma 2.1.

A quadrilateral should be closed shape with 4 sides

Lemma 2.2.

All the internal angles of a quadrilateral sum up to 360°

Let us consider first case, Where quadrilateral MIST has is constructed considering following parameters

$$MI = 3.5\text{cm},$$

$$IS = 6.5\text{cm},$$

$$\angle M = 75^\circ$$

$$, \angle I = 105^\circ \angle S = 120^\circ$$

The quadrilateral was plotted with given parameters, Co-ordinates were found to be-

$$M = (0,0)$$

$$I = (5,0)$$

$$S = (7.3, 6.3)$$

$$T = (2.5, 5.4)$$

Based on the co-ordinates, The value of angle T was calculated

$$\angle T = 55^\circ$$

Now, The sum of all angles should be 360° if MIST is a quadrilateral, Then

$$\angle M + \angle I + \angle S + \angle T = 360^\circ$$

$$75 + 110 + 120 + 55 = 360^\circ$$

Thus, The figure plotted with given parameters fulfills the criterion, i.e the sum of angles of a quadrilateral should be 360° , Thus we can plot the quadrilateral with given parameters.

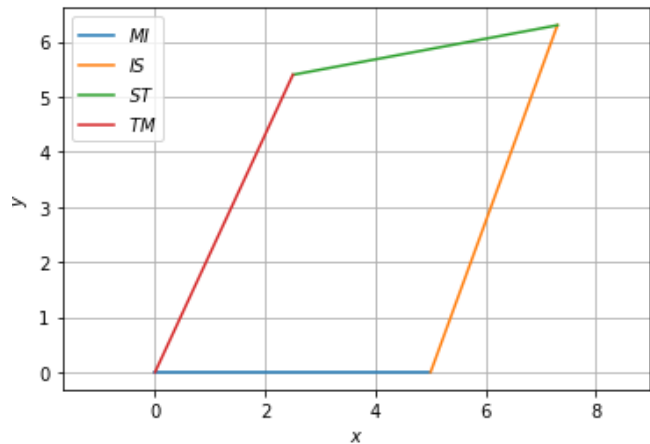


Fig. 0: Quadrilateral MIST when $\angle M = 75^\circ$

Let us consider second case, Where quadrilateral MIST attempted to be constructed considering following parameters $MI = 3.5$,

$$IS = 6.5,$$

$$\angle M = 100,$$

$$\angle I = 105,$$

Co-ordinates of line plot were found to be-

$$M = (0,0)$$

$$I = (5,0)$$

$$S = (7.3, 6.3)$$

$$T = (-0.9, 4.7)$$

Based on the co-ordinates, The value of angle T was calculated

$$\angle T = 80$$

Now, The sum of all angles should be 360° if MIST is a quadrilateral, Then

$$\angle M + \angle I + \angle S + \angle T = 360^\circ$$

$$100 + 110 + 120 + 80 \neq 360^\circ$$

”This doesn’t fulfill the criterion that the sum of all internal angle should be 360°

Thus we cannot construct the quadrilateral if

$$\angle M = 100$$

instead of 75° ”

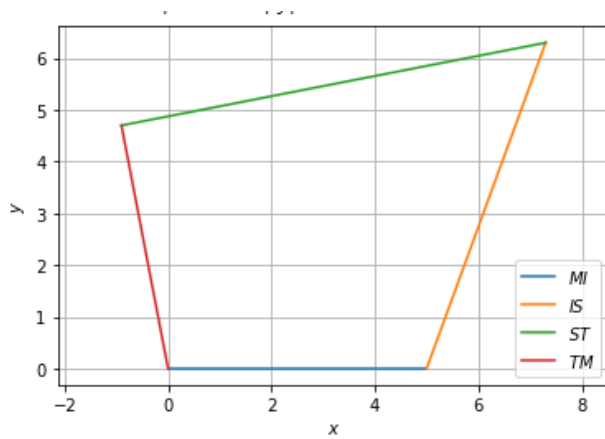


Fig. 0: Plotted figure when $\angle M = 100$