

ASSIGNMENT-2

UNNATI GUPTA

Download all python codes from

<https://github.com/unnatigupta2320/Assignment-2/tree/master/codes>

and latex-tikz codes from

<https://github.com/unnatigupta2320/Assignment-2/tree/master>

$$\angle M = \arcsin 0.7713; \quad (2.0.8)$$

$$\angle M = 50.47^\circ; \quad (2.0.9)$$

Now, polar coordinates of vertex S of $\triangle MIS$ be
(SM cos M, SM sin M)

$$\text{we get, } S(5.18, 6.27) \quad (2.0.10)$$

Similarly, we can get vertex T of $\triangle MTS$ as

$$T(2.42, 9.03) \quad (2.0.11)$$

1 QUESTION No. 2.36

Construct a quadrilateral MIST where $MI = 3.5$, $IS = 6.5$, $\angle M = 75^\circ$, $\angle I = 105^\circ$ and $\angle S = 120^\circ$.

2 SOLUTION

For this quadrilateral MIST we have,

$$\angle M + \angle I = 75^\circ + 105^\circ = 180^\circ, \quad (2.0.1)$$

$\Rightarrow MT \parallel IS$ (\because MI being the transversal)

As, sum of adjacent angle on same side is 180° only when lines are parallel. Now, considering ST as another transversal on parallel lines MT and IS then $\angle S$ and $\angle T$ being on same side of transversal, we get

$$\Rightarrow \angle S + \angle T = 180^\circ, \quad (2.0.2)$$

$$\Rightarrow \angle T = 60^\circ \quad (2.0.3)$$

Now taking sum of all the angles given and (2.0.3) we get

$$\angle M + \angle I + \angle S + \angle T = 360^\circ \quad (2.0.4)$$

So construction of given quadrilateral is possible as sum of all the angles is equal to 360° .

Now, Using cosine formula we can find SM:

$$\|S - M\|^2 = \|M - I\|^2 + \|I - S\|^2 - 2 \times \|M - I\| \times \|I - S\| \cos I \quad (2.0.5)$$

$$\Rightarrow SM = 8.14 \quad (2.0.6)$$

Also, using sine formula in $\triangle MIS$, we have

$$\frac{\sin M}{m} = \frac{\sin I}{i} = \frac{\sin S}{s} \quad (2.0.7)$$

- Now, we have the coordinate of vertices M, I, S, T as M(0,0); I(3.5,0); S(5.18,6.27); T(2.42,9.03);
- We can construct the quadrilateral. On constructing the given quadrilateral we, get:

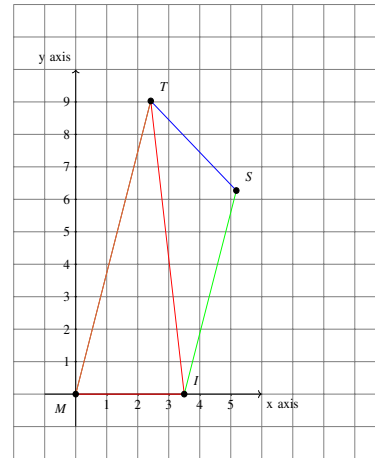


Fig. 2.1: Quadrilateral MIST