

# ASSIGNMENT-2

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Download all python codes from

[https://github.com/CRAMYATULASI/ASSIGNMENT\\_2/tree/main/ASSIGNMENT2/CODES](https://github.com/CRAMYATULASI/ASSIGNMENT_2/tree/main/ASSIGNMENT2/CODES)

and latex-tikz codes from

[https://github.com/CRAMYATULASI/ASSIGNMENT\\_2/tree/main/ASSIGNMENT2](https://github.com/CRAMYATULASI/ASSIGNMENT_2/tree/main/ASSIGNMENT2)

## 1 QUESTION NO-2.34

Draw GOLD such that  $OL = 7.5$ ,  $GL = 6$ ,  $GD = 6$ ,  $LD = 5$  and  $OD = 10$ .

## 2 SOLUTION

Given,

$$OL = 7.5, GL = 6, GD = 6, LD = 5, OD = 10. \quad (2.0.1)$$

Now,

$$OL = \|O - L\| = 7.5 \quad (2.0.2)$$

$$GL = \|G - L\| = 6 \quad (2.0.3)$$

$$GD = \|G - D\| = 6 \quad (2.0.4)$$

$$LD = \|L - D\| = 5 \quad (2.0.5)$$

$$OD = \|O - D\| = 10 \quad (2.0.6)$$

- 1) We know, a quadrilateral is a polygon with 4 sides if we have four points they will not form a quadrilateral if any three points are collinear.
- 2) Now, let us use the above fact and consider two triangles on same base if any three points are collinear it cannot be a triangle and then given sides cannot form a quadrilateral if any three sides are collinear.  $\triangle LDO$  and  $\triangle LDG$  are two triangles of given quadrilateral which are on same base  $LD$ . Now, we check if any three sides are collinear in two triangles. Let us consider  $\triangle LDO$ -

$$\|O - L\| + \|O - D\| = 17.5 > \|L - D\| \quad (2.0.7)$$

$$\|O - D\| + \|L - D\| = 15 > \|O - L\| \quad (2.0.8)$$

$$\|O - L\| + \|L - D\| = 12.5 > \|O - D\| \quad (2.0.9)$$

Triangle inequality is satisfied.

$\therefore \triangle LDO$  can be constructed.

Similarly, Now we consider  $\triangle LDG$

$$\|L - D\| + \|G - L\| = 11 > \|G - D\| \quad (2.0.10)$$

$$\|G - L\| + \|G - D\| = 12 > \|L - D\| \quad (2.0.11)$$

$$\|L - D\| + \|G - D\| = 11 > \|G - L\| \quad (2.0.12)$$

Triangle inequality is satisfied.

$\therefore \triangle LDG$  can be constructed.

$\therefore$  Given sides form a quadrilateral.

Vertices of quadrilateral GOLD:

Now from  $\triangle LDO$ , the sides of  $\triangle LDO$  are known. Which means vertices  $O, L$  and  $D$  can be obtained using example 1.2.3

Similarly, the vertices of  $\triangle LDG$  can be obtained using example 1.2.3

$\therefore$  Vertices of given Quadrilateral GOLD can be written as,

$$L = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, D = \begin{pmatrix} 5 \\ 0 \end{pmatrix}, O = \begin{pmatrix} -1.875 \\ 7.26 \end{pmatrix}, G = \begin{pmatrix} 2.5 \\ 5.5 \end{pmatrix} \quad (2.0.13)$$

Plot of the Quadrilateral GOLD :

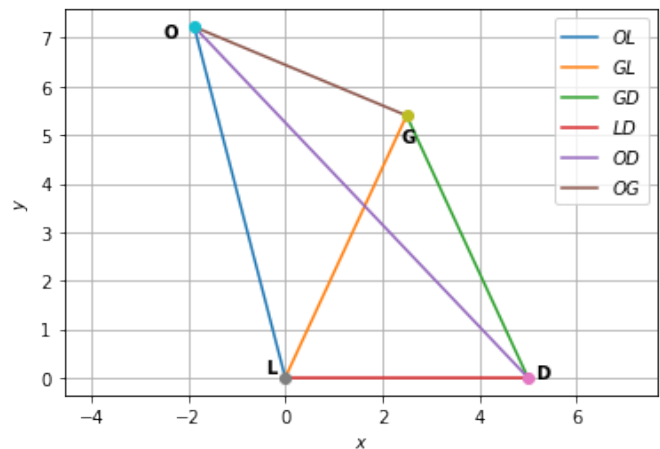


Fig. 2.1: Quadrilateral GOLD