ASSIGNMENT-2

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Download all python codes from

https://github.com/CRAMYATULASI/ASSIGNMENT-1/tree/main/ASSIGNMENT%201/CODES

and latex-tikz codes from

https://github.com/CRAMYATULASI/ASSIGNMENT-1/tree/main/ASSIGNMENT%201

1 QUESTION NO-2.34

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

2 SOLUTION

Given,

$$\text{OL= 7.5,GL= 6,GD= 6,LD= 5OD= 10.} \tag{2.0.1}$$

Now,

$$\text{OL= } \|\mathbf{O}-\mathbf{L}\| = 7.5 \tag{2.0.2}$$
$$\text{GL= } \|\mathbf{G}-\mathbf{L}\| = 6 \tag{2.0.3}$$
$$\text{GD= } \|\mathbf{G}-\mathbf{D}\| = 6 \tag{2.0.4}$$
$$\text{LD= } \|\mathbf{L}-\mathbf{D}\| = 5 \tag{2.0.5}$$
$$\text{OD= } \|\mathbf{O}-\mathbf{D}\| = 10 \tag{2.0.6}$$

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.

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 quadrialateral which are on same base LD

Now, we check if any three sides are collinear in two triangles.

Let us consider $\triangle LDO$-

$$\|\mathbf{O}-\mathbf{L}\| + \|\mathbf{O}-\mathbf{D}\| = 7.5 + 10 = 17.5 > \|\mathbf{L}-\mathbf{D}\| \tag{2.0.7}$$
$$\|\mathbf{O}-\mathbf{D}\| + \|\mathbf{L}-\mathbf{D}\| = 10 + 5 = 15 > \|\mathbf{O}-\mathbf{L}\| \tag{2.0.8}$$
$$\|\mathbf{O}-\mathbf{L}\| + \|\mathbf{L}-\mathbf{D}\| = 7.5 + 5 = 12.5 > \|\mathbf{O}-\mathbf{D}\| \tag{2.0.9}$$

We observe that no three sides are collinear.
$\therefore \triangle LDO$ can be constructed.
Similarly, Now we consider $\triangle LDG$

$$\|\mathbf{L}-\mathbf{D}\| + \|\mathbf{G}-\mathbf{L}\| = 5 + 6 = 11 > \|\mathbf{G}-\mathbf{D}\| \tag{2.0.10}$$
$$\|\mathbf{G}-\mathbf{L}\| + \|\mathbf{G}-\mathbf{D}\| = 6 + 6 = 12 > \|\mathbf{L}-\mathbf{D}\| \tag{2.0.11}$$
$$\|\mathbf{L}-\mathbf{D}\| + \|\mathbf{G}-\mathbf{D}\| = 5 + 6 = 11 > \|\mathbf{G}-\mathbf{L}\| \tag{2.0.12}$$

We observe that no three sides are collinear.
$\therefore \triangle LDG$ can be constructed.
$\therefore$ Given sides form a quadrilateral.

Plot of the quadrilateral GOLD :

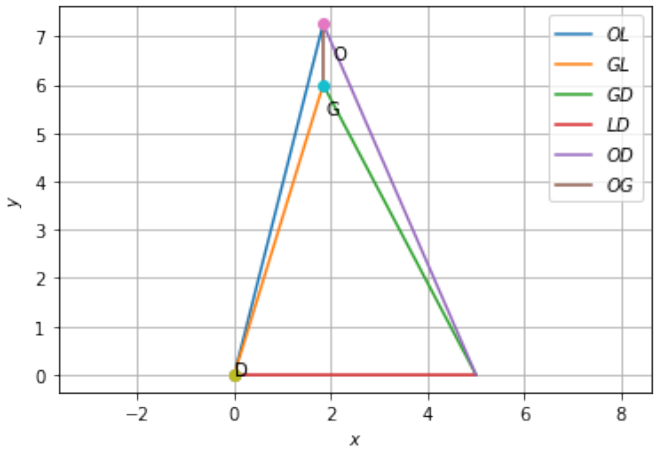

Fig. 2.1: Quadrilateral GOLD