ASSIGNMENT-2

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1 QUESTION NO-2.34

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

2 SOLUTION

Given,

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

Now,

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

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.

3) $\triangle LDO$ and $\triangle LDG$ are two triangles of given quadrialateral which are on same base LD

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

5) Let us consider $\triangle LDO$-

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

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

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

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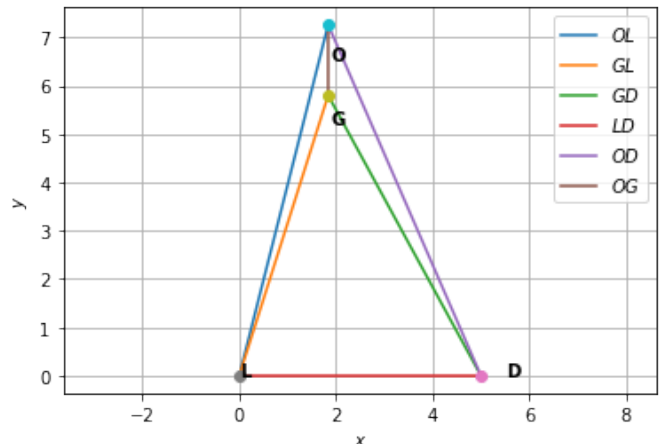$\therefore$ Given sides form a quadrilateral.

Plot of the quadrilateral GOLD :

Fig. 2.1: Quadrilateral GOLD