Assignment 1 ICSE 2019 10

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1 QUESTION 5C

Use a graph sheet for this question. (Take $1cm = 1unit$ along both x and y axis.)

i Plot the following points: A$(0,5)$, B$(3,0)$, C$(1,0)$ and D$(1,-5)$

ii Reflect the points B, C and D on the y axis and name them as B',C' and D' respectively.

iii Write down the coordinates of B, C' and D'.

iv Join the points A, B, C, D, D', C', B', A in order and give a name to the closed figure ABCDD'C'B'.

SOLUTION:

(1) First we will plot the points A, B, C and D which is shown in plot section.

(2) Now we will reflect the points

$$\mathbf{B} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \tag{1.0.1}$$

$$\mathbf{C} = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \tag{1.0.2}$$

$$\mathbf{D} = \begin{pmatrix} 1 \\ -5 \end{pmatrix} \tag{1.0.3}$$

using a refection matrix R,

$$\mathbf{R} = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \tag{1.0.4}$$

(3) Let us call the points of reflection of B,C,D on $y$axis as B',C',D' then

$$\mathbf{B'} = \mathbf{RB} \tag{1.0.5}$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 \\ 0 \end{pmatrix} = \begin{pmatrix} -3 \\ 0 \end{pmatrix} \tag{1.0.6}$$

$$\mathbf{C'} = \mathbf{RC} \tag{1.0.7}$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} \tag{1.0.8}$$

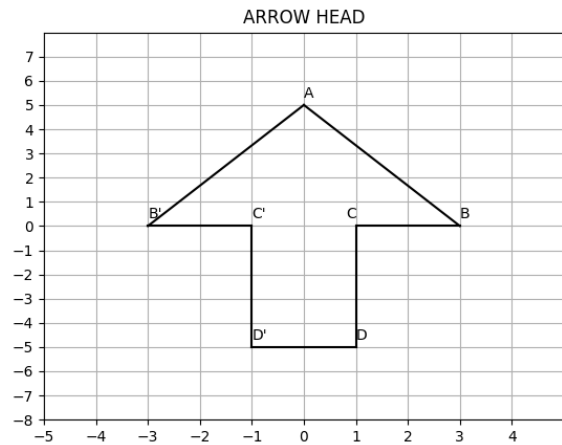$$\mathbf{D'} = \mathbf{RD} \tag{1.0.9}$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ -5 \end{pmatrix} = \begin{pmatrix} -1 \\ -5 \end{pmatrix} \tag{1.0.10}$$

(4) Now joining these points in the order of A, B, C, D, D', C',B',A which gives us a 7 sided polygon. We will call it as 'ARROW HEAD'.

PLOT:

Fig. 4. Arrow Head