

# 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.)

- Plot the following points: A(0, 5), B(3, 0), C(1, 0) and D(1, -5)
- Reflect the points B, C and D on the  $y$  axis and name them as B', C' and D' respectively.
- Write down the coordinates of B, C' and D'.
- Join the points A, B, C, D, D', C', B', A in order and give a name to the closed figure ABCDD'C'B'.

$$C' = RC \quad (1.0.7)$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} \quad (1.0.8)$$

$$D' = RD \quad (1.0.9)$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ -5 \end{pmatrix} = \begin{pmatrix} -1 \\ -5 \end{pmatrix} \quad (1.0.10)$$

- 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'.

## SOLUTION:

- First we will plot the points A, B, C and D which is shown in plot section.
- Now we will reflect the points

$$B = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \quad (1.0.1)$$

$$C = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (1.0.2)$$

$$D = \begin{pmatrix} 1 \\ -5 \end{pmatrix} \quad (1.0.3)$$

using a reflection matrix R,

$$R = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \quad (1.0.4)$$

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

$$B' = RB \quad (1.0.5)$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 3 \\ 0 \end{pmatrix} = \begin{pmatrix} -3 \\ 0 \end{pmatrix} \quad (1.0.6)$$

## PLOT:

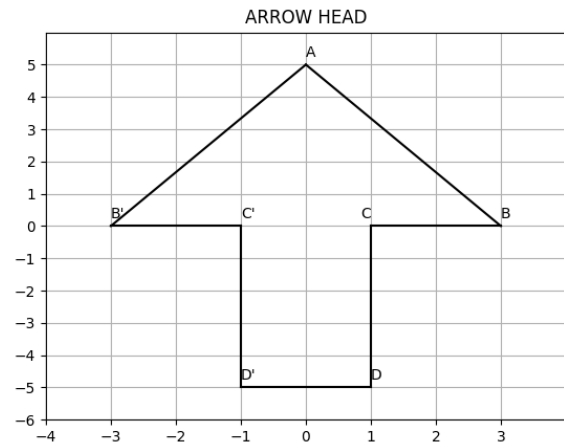


Fig. 4. Arrow Head