Solution to 1.4.5

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Question: Draw the circle with centre at **O** and radius

$$\mathbf{R} = \mathbf{OA} \tag{1}$$

This is known as circumradius
Solution:
Given:

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \tag{2}$$

$$\mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \tag{3}$$

$$\mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} \tag{4}$$

From **Q1.4.2**, the circumcentre is

$$\mathbf{O} = \frac{1}{12}\begin{pmatrix} -53 \\ 5 \end{pmatrix} \tag{5}$$

Now we will calculate **OA**,

$$\mathbf{OA} = \mathbf{A} - \mathbf{0} \tag{6}$$

$$= \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \frac{1}{12}\begin{pmatrix} -53 \\ 5 \end{pmatrix} \tag{7}$$

$$= \frac{1}{12}\begin{pmatrix} 65 \\ -17 \end{pmatrix} \tag{8}$$

now we will calculate radius,

$$\text{radius} = \|\mathbf{OA}\| \tag{9}$$

$$= \|\mathbf{A} - \mathbf{O}\| \tag{10}$$

$$= \frac{\sqrt{4514}}{12} \tag{11}$$

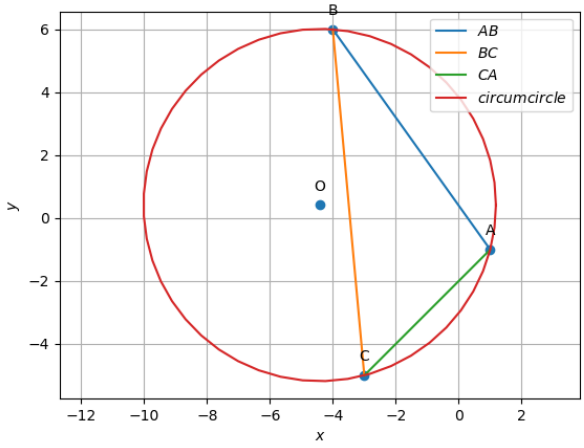

Fig. 0. circumcircle of Triangle ABC with centre O