

# Question: 11.11.1.5

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## 1 PROBLEM

Find the equation of circle with centre  $\begin{pmatrix} -a \\ -b \end{pmatrix}$  and radius  $\sqrt{a^2 - b^2}$ .

## 2 SOLUTION

centre of the given circle,

$$\mathbf{O} = \begin{pmatrix} -a \\ -b \end{pmatrix} \quad (2.0.1)$$

The radius of given circle,  $r = \sqrt{a^2 - b^2}$  The equation of given circle is,

$$\|\mathbf{x} - \mathbf{O}\|^2 = r^2 \quad (2.0.2)$$

$$\|\mathbf{x}\|^2 - 2\mathbf{O}^\top \mathbf{x} + \|\mathbf{O}\|^2 = r^2 \quad (2.0.3)$$

$$\|\mathbf{x}\|^2 - 2 \begin{pmatrix} -a & -b \end{pmatrix} \mathbf{x} + a^2 + b^2 = a^2 - b^2 \quad (2.0.4)$$

$$\|\mathbf{x}\|^2 + 2 \begin{pmatrix} a & b \end{pmatrix} \mathbf{x} + 2b^2 = 0 \quad (2.0.5)$$

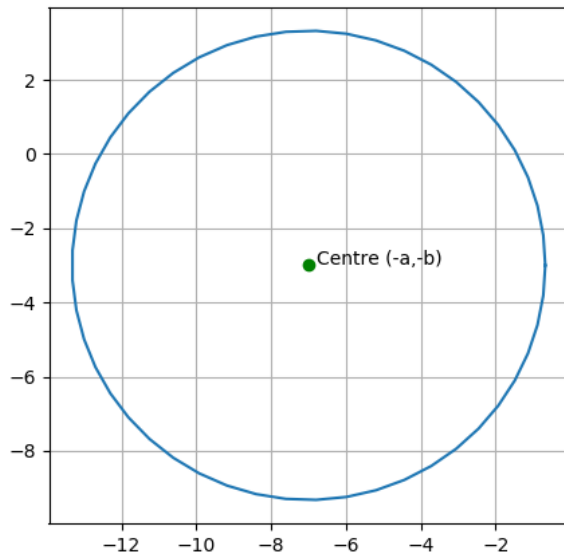


Fig. 0: Figure 1