

CIRCLE ASSIGNMENT

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Assignment

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1 Problem

If the chord $y=mx+1$ of the circle $x^2 + y^2 = 1$ subtends an angle of measures 45° at the major segment of the circle then find the value of m

2 Construction

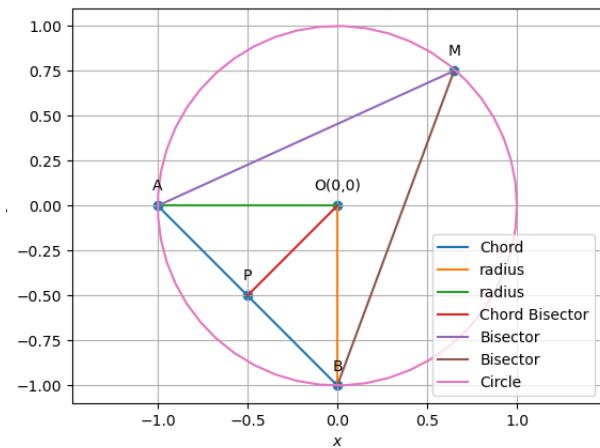


Figure of construction

3 Solution

Step1: The equation of a line given as

$$\Rightarrow \mathbf{n}^T \mathbf{X} = c \quad (1)$$

$$\Rightarrow (-m \ 1) \mathbf{X} = 1 \quad (2)$$

Step2: The foot of perpendicular from O to the line is given by

$$\Rightarrow (\mathbf{m} \ \mathbf{n})^T \mathbf{X} = \begin{pmatrix} \mathbf{m}^T \mathbf{O} \\ c \end{pmatrix} \quad (3)$$

$$\Rightarrow \begin{pmatrix} 1 & -m \\ m & 1 \end{pmatrix}^T \mathbf{X} = \begin{pmatrix} 0 \\ 1 \end{pmatrix} \quad (4)$$

from solving eq (4),we get

$$\Rightarrow \mathbf{X} = \begin{pmatrix} 0 \\ 1/m \end{pmatrix} \quad (5)$$

Step3: from eq (2) and (5),we get

$$\Rightarrow (-m \ 1) \begin{pmatrix} 0 \\ 1/m \end{pmatrix} = 1 \quad (6)$$

The value of m is

$$\boxed{m = 1} \quad (7)$$

Get the python code of the figures from

<https://github.com/jyothsna777/jyothsna-fwc.git>

termux commands :

bash rncom.sh.....using shell command