

Presentation Template

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1 Problem

2 Solution

- centre of circle in terms of a single variable
- circle equation
- substituting the values
- centre of the circle

Problem Statement

Find the equation of a circle passing through the point $(7, 3)$ having radius 3 units and whose centre lies on the line $y = x - 1$.

centre of circle in terms of a single variable

Let the centre of the circle be

$$-u = \binom{k}{k-1} \quad (3.1)$$

circle equation

$$\|x\|^2 + 2u^\top x + f = 0 \quad (3.2)$$

$$\|P\|^2 + 2u^\top P + f = 0 \quad (3.3)$$

$$\|u\|^2 - f = r^2 \quad (3.4)$$

substituting the values

$$\|P\|^2 + 2u^\top P + \|u\|^2 = r^2 \quad (3.5)$$

$$2k^2 - 2k + 1 + 6 - 20k + 7^2 + 3^2 - 3^2 = 0 \quad (3.6)$$

$$2k^2 - 22k + 56 = 0 \quad (3.7)$$

$$k = 7, 4 \quad (3.8)$$

centre of the circle

$$-u = \begin{pmatrix} 7 \\ 6 \end{pmatrix} \text{ or } \begin{pmatrix} 4 \\ 3 \end{pmatrix} \quad (3.9)$$