

# 1-1.9-27

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## Question:

If a point A (0, 2) is equidistant from the points B(3, p) and C (p, 5), then find the value of p.

**Solution:** We have  $AB = AC$ , which implies,

$$\|A - B\| = \|A - C\| \quad (0.1)$$

$$\sqrt{(A - B)^T(A - B)} = \sqrt{(A - C)^T(A - C)} \quad (0.2)$$

where  $A = \begin{pmatrix} 0 \\ 2 \end{pmatrix}$   $B = \begin{pmatrix} 3 \\ p \end{pmatrix}$   $C = \begin{pmatrix} p \\ 5 \end{pmatrix}$ .

$$\begin{pmatrix} -3 & 2 - p \end{pmatrix} \begin{pmatrix} -3 \\ 2 - p \end{pmatrix} = \begin{pmatrix} -p & -3 \end{pmatrix} \begin{pmatrix} -p \\ -3 \end{pmatrix} \quad (0.3)$$

$$9 + (2 - p)^2 = p^2 + 9 \quad (0.4)$$

$$p = 1 \quad (0.5)$$

