7-7.2-31

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Question:
The point (1,2) lies inside the circle $x^2 + y^2 - 2x + 6y + 1 = 0$.

Sol:

Label	Given
circle	$x^2 + y^2 - 2x + 6y + 1$
point	(1,2)

TABLE 0
GIVEN INFORMATION

The given circle equation can be rewritten as:

$$(x-1)^2 + (y+3)^2 = 9$$
$$\text{or} \quad r^2 = 9$$

Let the point $P = (1, 2)$.

$$\mathbf{O} = (1, -3)$$

Calculating the squared distance between P and O:

$$\begin{aligned} \|P - O\|^2 &= (1-1)^2 + (2-(-3))^2 \\ &= (1-1)^2 + (2+3)^2 \\ &= 0 + 5^2 \\ &= 0 + 25 \\ &= 25 \end{aligned}$$

$$\|P - O\|^2 = 25$$
$$\text{and} \quad r^2 = 9,$$

As,

$$25 > 9,$$

thus the point $P = (1, 2)$ lies outside the given circle.

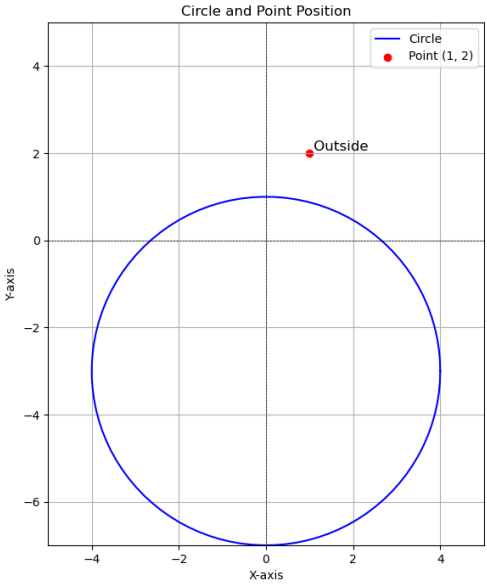

Fig. 0.1. Circle