Question-7-7.2-26

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:
The centre of circle is $(2a, a-7)$. Find the values of a if the circle passes through the point $\mathbf{A}\,(11,-9)$and has diameter $10\sqrt{2}$ units
Solution:

Description	Given value
point $\mathbf{C}$	$(2a, a-7)$
Diameter	$10\sqrt{2}$
point $\mathbf{A}$	$(11,-9)$

TABLE 0: variables used

The radius of circle is $\frac{diameter}{2}$

$$\implies radius = 5\sqrt{2} \tag{0.1}$$

$$\|\mathbf{A}-\mathbf{C}\| = 5\sqrt{2} \tag{0.2}$$

$$\mathbf{A}-\mathbf{C} = \begin{pmatrix} 11-2a \\ -2-a \end{pmatrix} \tag{0.3}$$

$$(11-2a)^2 + (2+a)^2 = 50 \tag{0.4}$$

$$a^2 - 8a + 15 = 0 \tag{0.5}$$

$$(a-3)(a-5) = 0 \tag{0.6}$$

$$\therefore a = 3 \text{ or } a = 5 \tag{0.7}$$

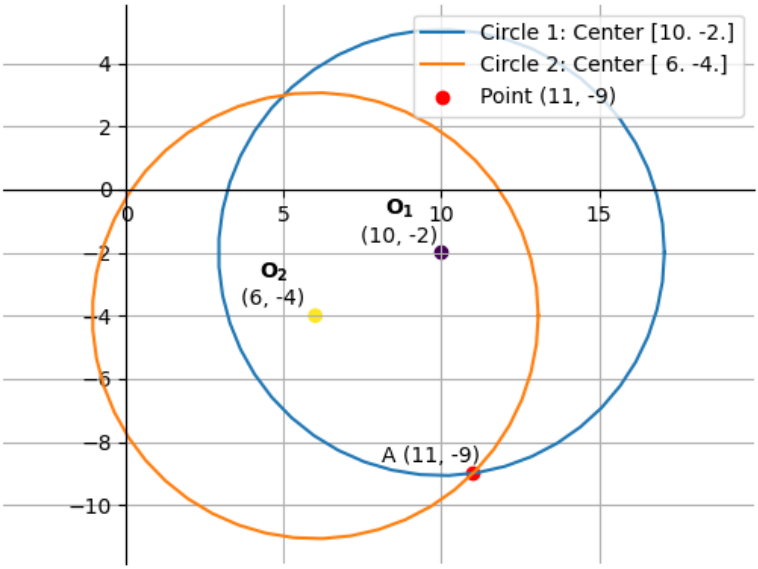
Circle 1: Center [10. -2.]
Circle 2: Center [6. -4.]
Point (11, -9)
O1
(10, -2)
O2
(6, -4)
A (11, -9)
4
2
0
−2
−4
−6
−8
−10
0
5
10
15

Fig. 0.1