Circles - Class XI

Past Year JEE Questions

Questions

Quetion: 01

If the circles

$x^2 + y^2 - 16x - 20y + 164 = r^2$

and $(x - 4)^2 + (y - 7)^2 = 36$

intersect at two distinct points, then :
A. $r > 11$
B. $0 < r < 1$
C. $r = 11$
D. $1 < r < 11$

Solutions

Solution: 01

Explanation

Circles are $x^2 + y^2 - 16x - 20y + 164 = r^2 \Rightarrow c_1 (8, 10)$

and $(x - 4)^2 + (y - 7)^2 = 36$

they intersect at two distinct points

$|r_1 - r_2| < c_1c_2 < r_1 + r_2 \{c_1c_2 = \sqrt{16 + 9} = 5\}$

Now $|r - 6| < 5 < r + 6$

$|r - 6| < 5$

$\Rightarrow -5 < r - 6 < 5$

$\Rightarrow 1 < r < 11 \quad \ldots (i)$

$5 < r + 6$

$-1 < r \quad \ldots (ii)$

from (i) and (ii)

$r \in (1, 11)$