Related Questions with Solutions

Questions

Quetion: 01

$S_1 \equiv x^2 + y^2 - 4x + 6y - 3 = 0$
$S_2 \equiv x^2 + y^2 + 4x - 6y - 12 = 0$
Find the number of integers in the range of 'r' so that the circles
$(x-1)^2 + (y-3)^2 = r^2$ and $(x-4)^2 + (y-1)^2 = 9$ intersects at 2 distinct points.

A. 6

B. 8

C. 10

D. 12

Solutions

Solution: 01

$C_1(1,3), r_1 = |r|$

$C_2(4,1), r_2 = 3$
$d = C_1C_2 = \sqrt{9+4} = \sqrt{13}$

$|r_1 - r_2| < d \leq r_1 + r_2$
$||r| - 3| \leq \sqrt{13} <| r | +3$
$\Rightarrow -\sqrt{13} \leq |r| - 3 < \sqrt{13} \Rightarrow 3 - \sqrt{13} < |r| < 3 + \sqrt{13}$
$-(3+\sqrt{13}) < r < (3+\sqrt{13})$.....[i]
Also, $\sqrt{13} < |r| + 3 \Rightarrow | r | \geq \sqrt{13} - 3$
$r \in (-\infty, 3-\sqrt{13}) \cup (\sqrt{13}-3, \infty)$.....[ii]
[1] $\cap$ [2]
$r \in (-(3+\sqrt{13}), 3-\sqrt{13}) \cup (\sqrt{13}-3, 3+\sqrt{13})$
So, number of integers in the range of r is 12.

Correct Options

Answer:01
Correct Options: D