Consider a circle C which touches the y-axis at (0, 6) and cuts off an intercept $6\sqrt{5}$ on the x-axis. Then the radius of the circle C is equal to :

A $\sqrt{53}$

B 9

C 8

D $\sqrt{82}$

Explanation
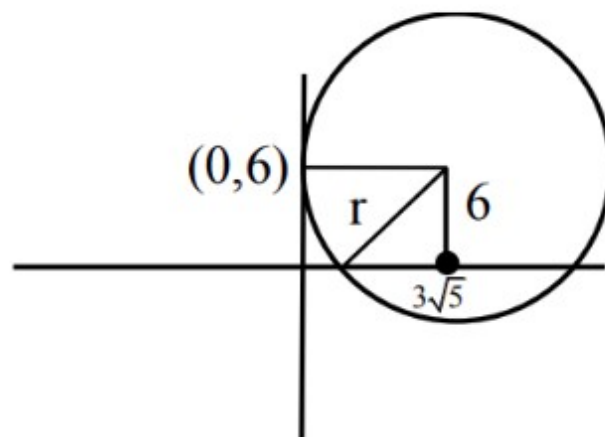
$$r = \sqrt{6^2 + (3 + \sqrt{5})^2}$$

$$= \sqrt{36 + 45} = 9$$

A circle C touches the line x = 2y at the point (2, 1) and intersects the circle

$C_1 : x^2 + y^2 + 2y - 5 = 0$ at two points P and Q such that PQ is a diameter of C_1. Then the diameter of C is :

A $7\sqrt{5}$

B 15

C $\sqrt{285}$

D $4\sqrt{15}$

Explanation

$(x - 2)^2 + (y - 1)^2 + \lambda(x - 2y) = 0$

$C : x^2 + y^2 + x(\lambda - 4) + y(-2 - 2\lambda) + 5 = 0$

$C_1 : x^2 + y^2 + 2y - 5 = 0$

$S_1 - S_2 = 0$ (Equation of PQ)

$(\lambda - 4)x - (2\lambda + 4)y + 10 = 0$ Passes through (0, −1)

$\Rightarrow \lambda = -7$

$C : x^2 + y^2 - 11x + 12y + 5 = 0$

$= \frac{\sqrt{245}}{4}$

Diameter = $7\sqrt{5}$

The number of integral values of k for which the line, 3x + 4y = k intersects the circle,

$x^2 + y^2 - 2x - 4y + 4 = 0$ at two distinct points is _____.

Answer

Correct Answer is **9**

Explanation

Circle $x^2 + y^2 - 2x - 4y + 4 = 0$

$\Rightarrow (x - 1)^2 + (y - 2)^2 = 1$

Centre: (1, 2), radius = 1

Line 3x + 4y - k = 0 intersects the circle at two distinct points.

$\Rightarrow$ distance of centre from the line < radius

$\Rightarrow \left| \dfrac{3 \times 1 + 4 \times 2 - k}{\sqrt{3^2 + 4^2}} \right| < 1$

$\Rightarrow$ |11 - k| < 5

$\Rightarrow$ 6 < k < 5

$\Rightarrow$ k $\in$ {7, 8, 9, ...15} since k $\in$ I

$\therefore$ Total 9 integral value of k.