

The graph of  $x^2 - 4x + y^2 + 6y - 24 = 0$  in the  $xy$ -plane is a circle. What is the radius of the circle?

A)  $2\sqrt{6}$

B)  $\sqrt{11}$

C)  $\sqrt{37}$

D)  $\sqrt{76}$

Complete the square

$(x-a)^2 + (y-b)^2 = r^2$  twice

$$\underline{x^2 - 4x} + \underline{y^2 + 6y} - 24 = 0$$

$$\underline{x^2 - 4x + 4} + \underline{y^2 + 6y + 9} = 24 + 4 + 9$$

$$\begin{aligned} -\frac{4}{2} &= -2 \\ (-2)^2 &= 4 \end{aligned}$$

$$\begin{aligned} \frac{6}{2} &= 3 \\ 3^2 &= 9 \end{aligned}$$

$$(x-2)^2 + (y+3)^2 = 37$$

radius  $\sqrt{37}$   
Answer C.

$$\begin{array}{r} 9 \\ 3 \times 3 \\ \hline 6 \end{array} \quad \begin{array}{l} y^2 + 6y + 9 \\ (y+3)(y+3) \\ (y+3)^2 \end{array}$$

$$\begin{array}{r} 4 \\ -2 \times -2 \\ \hline -4 \end{array} \quad \begin{array}{l} x^2 - 4x + 4 \\ (x-2)(x-2) \\ (x-2)^2 \end{array}$$