

3bi

$$x - y = 1 \quad \text{--- Linear}$$

$$x^2 + y^2 = 25 \quad \text{--- Quadratic.}$$

Step 1: Take the linear and get x on its own.

$$x - y = 1$$

$$\boxed{x = y + 1}$$

Step 2: Sub x into the quadratic.

$$x^2 + y^2 = 25$$

$$(y+1)^2 + y^2 = 25$$

Rough work.
Simplify $(y+1)^2$

$$y^2 + 2y + 1 + y^2 = 25.$$

$$(y+1)^2 = (y+1)(y+1)$$

$$y^2 + 2y + 1 + y^2 - 25 = 0.$$

(Add like terms)

$$= y^2 + y + y + 1$$

$$= y^2 + 2y + 1$$

$$2y^2 + 2y - 24 = 0. \rightarrow (\div \text{ by } 2 \text{ to simplify})$$

$$y^2 + y - 12 = 0. \rightarrow (\text{solve the quadratic equation for } 2 \text{ values of } y)$$

Step 3: Solve the Quadratic equation

$$y^2 + y - 12 = 0$$

$$y^2 = y \cdot y$$

$$-12 = \begin{matrix} -12 \times 1 & -6 \times 2 & -4 \times 3 \\ 12 \times -1 & 6 \times -2 & 4 \times -3 \end{matrix}$$

$$(y + 4)(y - 3) = 0$$

$$y + 4 = 0$$

$$\boxed{y = -4}$$

$$y - 3 = 0$$

$$\boxed{y = 3}$$

\rightarrow using trial and error, find a set of factors for -12 that will work.

$$\text{check: } -3y + 4y = 1y \checkmark$$

Step 4 use y to find x .

From step 1, $x = y + 1$.

if $y = -4$

$$x = -4 + 1$$

$$\boxed{x = -3}$$

if $y = 3$

$$x = 3 + 1$$

$$\boxed{x = 4}$$

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