

Simultaneous Equations with a Quadratic

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

$$x = 7 - y$$

In this example we have to solve the simultaneous equation by substituting. We change x for $(7 - y)$.

$$(7 - y)^2 + y^2 = 25$$

$$(7 - y)(7 - y) + y^2 = 25$$

$$49 - 7y - 7y + y^2 + y^2 = 25$$

$$49 - 14y + 2y^2 = 25$$

$$2y^2 - 14y + 24 = 0$$

$$y^2 - 7y + 12 = 0$$

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

$$y = 3 \text{ or } y = 4$$

$$\text{If } y = 3$$

$$x = 7 - 3$$

$$x = 4$$

$$\text{If } y = 4$$

$$x = 7 - 4$$

$$x = 3$$