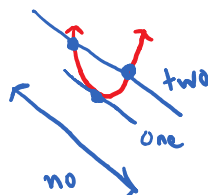


Nonlinear Systems of Equations

Goal: To solve these things!

(ex) solve

a)
$$\begin{cases} y = x^2 \\ 3x - y = 2 \end{cases}$$
 parabola



$$3x - x^2 = 2$$

$$-1(-x^2 + 3x - 2) = 0 \cdot (-1)$$

$$x^2 - 3x + 2 = 0$$

$$(x - 1)(x - 2) = 0$$

$$x = 1 \text{ or } x = 2$$

$$y = 1^2 \quad y = (2)^2$$

$$(1, 1)$$

$$y = 4$$

$$(2, 4)$$

b)

$$x^2 + y^2 = 45$$

$$x - y = 3$$

$$+y \quad +y$$

$$x = y + 3$$

$$(y + 3)^2 + y^2 = 45$$

$$y^2 + 6y + 9 + y^2 = 45$$

$$x = (y+3)$$

$$(y+3)^2 + y^2 = 45$$

$$y^2 + 6y + 9 + y^2 = 45$$

$$2y^2 + 6y + 9 = 45$$

$$\frac{2y^2}{2} + \frac{6y}{2} - \frac{36}{2} = \frac{0}{2}$$

$$y^2 + 3y - 18 = 0$$

$$(y-3)(y+6) = 0$$

$$y-3=0 \text{ or } y+6=0$$

$$y=3 \text{ or } y=-6$$

$$x = y+3$$

$$x = y+3$$

$$x = 6$$

$$x = -6+3$$

$$x = -3$$

$$(6, 3)$$

$$(-3, -6)$$

$$c) 3(m^2 - n^2 = 15)$$

$$2m^2 + 3n^2 = 35$$

$$3m^2 - 3n^2 = 45$$

$$5m^2 = 80$$

$$\sqrt{m^2} = \pm\sqrt{16}$$

$$m = \pm 4$$

$$16 - n^2 = 15$$

$$\begin{array}{r} -16 \\ \hline -n^2 = -1 \end{array}$$

$$\sqrt{n^2} = \pm\sqrt{1}$$

$$n = \pm 1$$

$$(\pm 4, -1) (\pm 4, 1)$$