

## Nonlinear Systems (ALG.SYS.07)

Solve each system.

1.  $\begin{cases} x + y = 1 \\ y = x^2 - 5 \end{cases}$   $(-3, 4), (2, -1)$
2.  $\begin{cases} x - y = 3 \\ y = x^2 + 3x - 11 \end{cases}$   $(-4, -7), (2, -1)$
3.  $\begin{cases} 2x + y = -2 \\ y = x^2 + 6x + 10 \end{cases}$   $(-6, 10), (-2, 2)$
4.  $\begin{cases} y = -\frac{1}{2}x - 8 \\ y = (x - 2)(x + 5) \end{cases}$   $(-4, -6), \left(\frac{1}{2}, -\frac{33}{4}\right)$
5.  $\begin{cases} y = x^2 - 4x - 8 \\ y = -x^2 - 2x + 16 \end{cases}$   $(-3, 13), (4, -8)$
6.  $\begin{cases} x^2 + y^2 = 5 \\ y - 3x = 5 \end{cases}$   $(-2, -1), (-1, 2)$
7.  $\begin{cases} y = 2x - 7 \\ (x - 1)^2 + y^2 = 10 \end{cases}$   $(2, -3), (4, 1)$
8.  $\begin{cases} x^2 + y^2 = 5 \\ (x - 1)^2 + (y + 1)^2 = 9 \end{cases}$   $(-2, -1), (1, 2)$
9.  $\begin{cases} xy = 6 \\ 2x - y = 4 \end{cases}$   $(-1, -6), (3, 2)$
10.  $\begin{cases} xy = -4 \\ x + y = 3 \end{cases}$   $(-1, 4), (4, -1)$
11.  $\begin{cases} x + y + 3 = 0 \\ x^2 + 2y(y - 6) = 18 \end{cases}$   $(-6, 3), (-2, -1)$
12.  $\begin{cases} x + y = 6 \\ x^2 + xy - y^2 = -4 \end{cases}$   $(2, 4), (16, -10)$

$$13. \begin{cases} y = 1 - x \\ x^2 - xy + y^2 = 1 \end{cases} \quad (0, 1), (1, 0)$$

$$14. \begin{cases} xy = 8 \\ x^2 + y^2 = 20 \end{cases} \quad (-4, -2), (-2, -4), (2, 4), (4, 2)$$

$$15. \begin{cases} 2x^2 - 3y^2 = 5 \\ 3x^2 + 4y^2 = 16 \end{cases} \quad (-2, -1), (-2, 1), (2, -1), (2, 1)$$

$$16. \begin{cases} y = x^3 - 2 \\ y - 2x^2 + 2 = 0 \end{cases} \quad (0, -2), (2, 6)$$

$$17. \begin{cases} 2x^2 + xy = 4 \\ x^2 - 2xy = -3 \end{cases} \quad (-1, -2), (1, 2)$$

$$18. \begin{cases} y = x^3 + 3x^2 - 5 \\ y - 4x = 7 \end{cases} \quad (-3, -5), (-2, -1), (2, 15)$$

$$19. \begin{cases} 3y^2 + x^2 = 7x^2y^2 \\ 5y^2 - 2x^2 + 3x^2y^2 = 0 \end{cases} \quad \left(-1, -\frac{1}{2}\right), \left(-1, \frac{1}{2}\right), (0, 0), \left(1, -\frac{1}{2}\right), \left(1, \frac{1}{2}\right)$$

$$20. \begin{cases} x^2 + y^2 = 4 \\ 2y = x^2 - 4 \end{cases} \quad (-2, 0), (0, -2), (2, 0)$$

$$21. \begin{cases} (x + 2)^2 + (y - 2)^2 = 16 \\ 4(y - 2) = (x + 2)^2 - 16 \end{cases} \quad (-6, 2), (-2, -2), (2, 2)$$