

**System of Equations****Advanced****Non-Linear**

1.  $xy = 2, 2x^2 + y^2 = 6$

2.  $xy = 7, 7x^2 + y^2 = 56$

3.  $xy = 12, 12x^2 + y^2 = 156$

4.  $xy = 8, 8x^2 + y^2 = 72$

5.  $x^2 + y^2 = 162, xy = 81$

6.  $xy = 6, x^2 + y^2 = 37$

7.  $xy = 24, 3x - y = -6$

8.  $y = 2x - 3, y = -\frac{1}{2x} + 4$

9.  $y = x + 3, 4x^2 + y^2 = 9$

10.  $x + y = 2, y = x^2 - 18$

**Answers**

**System of Equations**

**Advanced**

**Non-Linear**

$$1. \left( \begin{array}{l} x = 1, \quad y = 2 \\ x = -1, \quad y = -2 \\ x = \sqrt{2}, \quad y = \sqrt{2} \\ x = -\sqrt{2}, \quad y = -\sqrt{2} \end{array} \right)$$

$$2. \left( \begin{array}{l} x = 1, \quad y = 7 \\ x = -1, \quad y = -7 \\ x = \sqrt{7}, \quad y = \sqrt{7} \\ x = -\sqrt{7}, \quad y = -\sqrt{7} \end{array} \right)$$

$$3. \left( \begin{array}{l} x = 1, \quad y = 12 \\ x = -1, \quad y = -12 \\ x = 2\sqrt{3}, \quad y = 2\sqrt{3} \\ x = -2\sqrt{3}, \quad y = -2\sqrt{3} \end{array} \right)$$

$$4. \left( \begin{array}{l} x = 1, \quad y = 8 \\ x = -1, \quad y = -8 \\ x = 2\sqrt{2}, \quad y = 2\sqrt{2} \\ x = -2\sqrt{2}, \quad y = -2\sqrt{2} \end{array} \right)$$

$$5. \left( \begin{array}{l} x = 9, \quad y = 9 \\ x = -9, \quad y = -9 \end{array} \right)$$

$$6. \left( \begin{array}{l} x = 1, \quad y = 6 \\ x = -1, \quad y = -6 \\ x = 6, \quad y = 1 \\ x = -6, \quad y = -1 \end{array} \right)$$

$$7. \left( \begin{array}{l} x = -4, \quad y = -6 \\ x = 2, \quad y = 12 \end{array} \right)$$

$$8. \left( \begin{array}{l} x = \frac{7 + 3\sqrt{5}}{4}, \quad y = \frac{7 + 3\sqrt{5}}{2} - 3 \\ x = \frac{7 - 3\sqrt{5}}{4}, \quad y = \frac{7 - 3\sqrt{5}}{2} - 3 \end{array} \right)$$

$$9. \begin{pmatrix} x = 0, & y = 3 \\ 6 & 9 \\ x = -\frac{6}{5}, & y = \frac{9}{5} \end{pmatrix}$$

$$10. \begin{pmatrix} x = -5, & y = 7 \\ x = 4, & y = -2 \end{pmatrix}$$