

# Linear Quadratic Systems

## Procedure for Solving Linear – Quadratic Systems by Substitution

1. Solve for one of the variables in the linear equation
2. Substitute that expression into the quadratic equation
3. Solve the resulting quadratic equation in one variable
4. Substitute those values back into the linear equation
5. Write the possible solutions as ordered pairs.
6. Check EACH ordered pair in both equations

**Example** Find the solution set  $y = x^2 - 2x + 1$   
 $x + y = 3$

1.  $y = 3 - x$
2.  $3 - x = x^2 - 2x + 1$
3.  $0 = x^2 - x - 2$   
 $0 = (x - 2)(x + 1)$   
 $x = 2$  or  $x = -1$
4.  $x + y = 3$ ; if  $x = 2$ , then  $y = 1$   
 $x + y = 3$ ; if  $x = -1$ , then  $y = 4$
5.  $\{(2, 1) \text{ or } (-1, 4)\}$

Solve the following systems of equations.

1.  $y = x^2 - 5x + 7$   
 $y = 2x + 1$
2.  $y = x^2 - 2x + 1$   
 $x + y = 3$
3.  $x^2 + y^2 = 13$   
 $y = x + 1$
4.  $y = x^2 - x - 6$   
 $y = 2x - 2$

5.  $x^2 + y^2 = 26$   
 $x - y = 6$

6.  $y = x^2$   
 $y = x - 4$

7.  $x^2 + 4y^2 = 25$   
 $x - 2y = -1$

8.  $x^2 + 4y^2 = 36$   
 $x - 2y = 6$

9.  $xy = 12$   
 $3x + 4y = 24$

10.  $3x^2 + xy = 15$   
 $2x + y = 2$

11.  $y = 4x$   
 $\frac{2}{x} + \frac{4}{y} = 1$

12.  $x^2 + y^2 = 1$   
 $y = \frac{1}{3}x + 6$

***Check your answers in Both equations!***