Quadratics, Completing the Square

$$ax^2 + bx + c = 0$$

Algorithm

1. Make sure a = 1
2. Put variables on one side, number on the other side
3. Take ½ linear term and square
4. Add that result to both sides
5. Factor (use ½ linear term)
6. Solve resulting equation using $x^2 = n$ Method

Example

Solve by completing the square. $x^2 - 6x + 2 = 0$

1. $a = 1$
2. $x^2 - 6x = -2$
3. ½ of 6 is 3, square is 9
4. $x^2 - 6x + 9 = -2 + 9$
5. $(x - 3)^2 = 7$

   $x - 3 = \pm\sqrt{7}$

   $x = \pm\sqrt{7} + 3$

***Hint- If the coefficient of the quadratic term is not 1 or if b is an odd number, completing the square is typically not the best option to solve an equation.**

Solve the following equations by completing the square.

1. $x^2 + 10x - 11 = 0$

2. $x^2 - 4x + 12 = 0$

3. $x^2 + 2x - 12 = 0$

4. $x^2 + 2x + 8 = 0$

5. $x^2 - 6x + 4 = 0$

6. $x^2 + 2x = 0$

7. $x^2 + 10x + 21 = 0$

8. $x^2 - 14x + 46 = 0$

9. $2x^2 + 8x - 12 = 0$

10. $2x^2 - 3x - 5 = 0$