**Completing the Square**

To complete the square for an expression of the form x2 + bx, follow these steps.

1. Find half of \_\_\_\_ (the number in front of x)
2. Square what you get from \_\_\_\_\_\_\_\_\_
3. Add the number from \_\_\_\_\_\_\_\_to x2 + bx

Then the new expression: x2 + bx + c

can be factored as: ( x + )2

Examples:

x2 + 6x x2 – 5x

Step 1: ½ of \_\_\_ is \_\_\_ Step 1: ½ of \_\_\_ is \_\_\_

Step 2: \_\_\_2 is \_\_\_ Step 2: \_\_\_2 is \_\_\_

Step 3: x2 + 6x + \_\_\_ Step 3: x2 + 5x + \_\_\_

Factor: (x + \_\_\_)2 Factor: (x + \_\_\_)2

You Try It:

1. x2 – 4x 2) x2 + 13x
2. x2 + 16x 4) x2 – 3x

**Solving a Quadratic Equation by Completing the Square**

The method of completing the square can be used to solve (find the roots) any quadratic equation. To solve by completing the square, the quadratic has to be written in the form

x2 + bx = d

Use the following steps:

1. Find half of \_\_\_\_ (the number in front of x)
2. Square what you get from \_\_\_\_\_\_\_\_\_
3. Add the number from \_\_\_\_\_\_\_\_to BOTH sides of the equation
4. Write the left side as ( x + )2
5. Take the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each side
6. Add or Subtract to get x by itself

Examples:

x2 – 16x = –15

Step 1: ½ of \_\_\_ is \_\_\_

Step 2: \_\_\_2 is \_\_\_

Step 3: x2 – 16x + \_\_\_ = –15 + \_\_\_

Step 4: ( x + \_\_\_ )2 = \_\_\_\_\_

Step 5: x + \_\_\_ = ± \_\_\_ ( ± means plus or minus, because the square root of a

Step 6: x = \_\_\_ or \_\_\_ number can be positive or negative )

x2 + 12x = –8

Step 1: ½ of \_\_\_ is \_\_\_

Step 2: \_\_\_2 is \_\_\_

Step 3: x2 + 12x + \_\_\_ = –8 + \_\_\_

Step 4: ( x + \_\_\_ )2 = \_\_\_\_\_

Step 5: x + \_\_\_ = ± \_\_\_ ( Round your answer to the nearest tenth )

Step 6: x = \_\_\_ or \_\_\_

You Try It:

1. x2 – 2x = 3 2) x2 – 8x = 9
2. x2 + 2x = 5 4) x2 – 4x = –2
3. x2 + 14x = 15 6) x2 – 5x = 8