BELL RINGER

1.) Evaluate $\left(\frac{b}{2}\right)^2$ when b = 11.

2.) Multiply $(5 - 6i)(2 + 3i)$

3.) Solve $5x - 3x + 2 = -19$

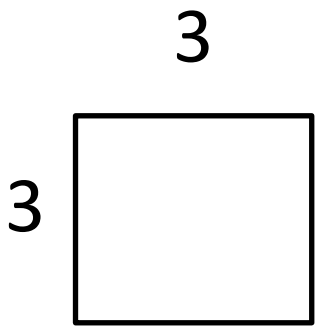
Solving Quadratic Equations by Completing the Square

- **Objective:** Students will be able to solve quadratic equations by completing the square.
- **"I Can" Statement:** I can use completing the square to solve a quadratic equation.
- **HSA-REI.4:** Solve quadratic equations in one variable.

HSA-REI.4

Quadratic equations can be solved by completing the square.

The area of a square is the product of multiplication of two equal length sides.

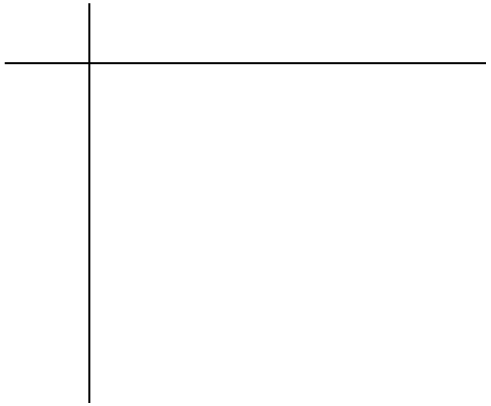


$A = (3)(3) = 3^2 = 9$

Similarly, a perfect square trinomial is the product of two of the same binomials multiplied together.

$$(x + 2)(x + 2) = x^2 + 4x + 4$$

We can represent this visually using Algebra tiles.



Notice how the multiplication of $(x + 2)(x + 2)$ results in a square product. We can rewrite $(x + 2)(x + 2)$ as $(x + 2)^2$ which will allow us to solve quadratic equations using square roots.

HSA-REI.4

Not all quadratic equations are perfect square trinomials so we will need to complete the square occasionally to use this solving technique. Complete the table using algebra tiles. What patterns do you notice?

Expression	Value of *c* needed to complete the square	Expression written as a binomial squared
$x^2 + 2x + c$		
$x^2 + 6x + c$		
$x^2 - 8x + c$		

Find the value of *c* that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

$$k^2 - 20k + c$$

You try!

Find the value of *c* that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

$a^2 - 12a + c$

$y^2 + 8y + c$

$x^2 + 10x + c$

$d^2 - 2d + c$

$e^2 + 4e + c$

You try!

Find the value of c that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

$a^2 - 12a + c$ $\quad c = 36, (a-6)^2$

$y^2 + 8y + c$ $\quad c = 16, (y+4)^2$

$x^2 + 10x + c$ $\quad c = 25, (x+5)^2$

$d^2 - 2d + c$ $\quad c = 1, (d-1)^2$

$e^2 + 4e + c$ $\quad c = 4, (e+2)^2$

Solve $x^2 - 8x = 10$ by completing the square.

Note Sheet!

Solve $x^2 + 4x = 6$ by completing the square.

Solve $k^2 + 6k + 25 = 0$ by completing the square.

Note Sheet!

Solve $2y^2 - 8y = -10$ by completing the square.

You Do Problems: Solve using completing the square.

$a^2 - 12a = 10$

$y^2 + 8y - 2 = 0$

$2x^2 + 20x = 6$

You Do Problems: Solve using completing the square.

$a^2 - 12a = 10$ $\quad a = 6 \pm \sqrt{46}$

$y^2 + 8y - 2 = 0$ $\quad y = -4 \pm 3\sqrt{2}$

$2x^2 + 20x = 6$ $\quad x = -5 \pm 2\sqrt{7}$