

## **9.6: Factor Trinomials in the form $ax^2 + bx + c$ :**

**Goals:** \*Factor quadratics when  $a$  does not equal 1

\*Solve quadratics by factoring

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\*Remember that when factoring trinomials you are essentially **un-F.O.I.L.ing**

Recall that when you foil:

- The **first** term of the final answer is obtained by:
- The **last** term of the final answer is obtained by:
- The **second/middle** term of the final answer is obtained by:

$$(d + e)(f + g) = ax^2 + bx + c$$

**Factor each trinomial into the product of two binomials:**

**Ex:**  $2x^2 - 7x + 3$

**Ex:**  $3n^2 + 14n - 5$

**Ex:**  $3t^2 + 8t + 4$

**Ex:**  $4s^2 - 9s + 5$

**Ex:**  $2n^2 + 13n - 7$

**Ex:**  $2x^2 - 13x + 6$

**Factor:**

**Ex:**  $-4x^2 + 12x + 7$

**Ex:**  $-2y^2 - 5y - 3$

**Ex:**  $-5m^2 + 6m - 1$

**Ex:**  $-3x^2 - x + 2$

**Ex:**  $-3x^2 - 13x - 4$

**Ex:** An athlete throws a discus from an initial height of 6 feet and with an initial vertical velocity of 46 ft/s.

a. Write an equation that gives the height of the discus as a function of time (in seconds) since it left the athlete's hand.

b. After how many seconds does it hit the ground?



**Ex:** A soccer goalie throws the ball into the air with an initial vertical velocity of 28 ft/s, from an initial height of 8 feet.

- a. Write an equation that gives the height of the soccer ball as a function of time.
  
- b. How long does it take for the ball to reach the ground?

**Ex:** A rectangle's length is 13 meters more than 3 times its width. The area is 10 square meters. What is the width?

**Ex:** A rectangles length is 5 feet more than 4 times the width. The area is 6 square feet. What is the width?

**Factoring  $ax^2 + bx + c$  FORMULA:** You still must check your answer by FOILing...even if using the steps below.

**Ex:** Factor  $2x^2 - 7x + 3$  using the following steps:

1.  $a =$   $c =$

$a \cdot c =$

2.

3.

4.

5. Find the GCF in each set of parenthesis **separately**. You want the leftover binomial (the stuff in parenthesis) to match.

6. The matching binomial is a **common factor** so factor it out, just like you would a **GCF**.

7. Check your answer by FOILing.

**Factor the following examples using the formula:**

**Ex:**  $3x^2 + 10x + 3$

**Ex:**  $2x^2 + 5x - 63$

**Ex:**  $2x^2 - 7x + 3$

**Ex:**  $3x^2 - 17x + 10$

**Ex:**  $4x^2 + 16x + 15$

**Ex:**  $8x^2 - 2x - 3$