Algebra 1
Lesson 8.5: Factoring Special Products
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The ability to see a pattern can save you a lot of time and energy when you are factoring a polynomial.

Vocabulary: **Perfect Square –** a trinomial where the first and last terms are perfect squares and the middle term is 2 times the factor of the first term and last term.

There are 2 forms of a **perfect square:**

$$a^2 + 2ab + b^2 = (a + b)^2$$
$$a^2 - 2ab + b^2 = (a - b)^2$$

Factor:	
$x^2 + 12x + 36$ $x \cdot x + 2(6)x + 6 \cdot 6$ $\therefore$ $(x + 6)^2$	1. Is the first term a perfect square? 2. Is the last term a perfect square? 3. Linear term=2ab? 4. So factor using the pattern of a perfect square.

Factor if possible:

$x^2 + 4x + 4$ $\qquad$ $x^2 - 14x + 49$ $\qquad$ $9x^2 - 6x + 4$

Another important polynomial pattern to remember is the **difference of two squares.** The term is self-describing, that is, it is what it is called: two terms that are perfect squares and are subtracted from each other.

$$a^2 - b^2 = (a + b)(a - b)$$

Factor:

$x^2 - 16$ $x^2 - 4^2$ $(x + 4)(x - 4)$	1. First and last terms are perfect squares 2. They are subtracted from each other. 3. Factor per equation.

You try:

$x^2 - 25$ $\qquad$ $x^2 - 49$ $\qquad$ $4x^2 - 36$

A company produces square sheets of aluminum. Each has an area of $(9x^2 + 6x + 1)m^2$. The side length of each sheet is in the form of $cx + d$, where c and d are whole umbers. Find an expression in terms of x for the perimeter of a sheet. When x=3 meters, what is the perimeter?