Example 1 **Factor a Difference of Squares**

Factor each binomial, if possible.

a) $x^2 - 9$ b) $-16c^2 + 25a^2$

c) $m^2 + 16$ d) $7g^3h^2 - 28g^5$

a) $\sqrt{x^2} = x$
$\sqrt{9} = 3$
$(x+3)(x-3)$
$x^2 - 3x + 3x - 9$
$x^2 - 9$

b) $25a^2 - 16c^2$
$\sqrt{25a^2} = 5a$
$\sqrt{16c^2} = 4c$
$(5a+4c)(5a-4c)$
$25a^2 - 20ac + 20ac - 16c^2$
$25a^2 - 16c^2$

d) $7g^3(h^2 - 4g^2)$
$7g^3(h+2g)(h-2g)$
$7g^3(h^2 - 2gh + 2gh - 4g^2)$
$7g^3(h^2 - 4g^2)$
$7g^3h^2 - 28g^5$

c) - Not a difference of squares
- No common factor
∴ cannot factor.

Example 2 **Factor Perfect Square Trinomials**

Factor each trinomial, if possible.

a) $x^2 + 6x + 9$ b) $2x^2 - 44x + 242$ c) $c^2 - 12x - 36$

a) $\sqrt{9} = 3$
$(x+3)^2$
$(x+3)(x+3)$
$x^2 + 3x + 3x + 9$
$= x^2 + 6x + 9$

b) $2(x^2 - 22x + 121)$
$\sqrt{121} = \pm 11$
$-11 \times 2 = -22$
$2(x-11)^2$
$2(x-11)(x-11)$
$2(x^2 - 11x - 11x + 121)$
$2(x^2 - 22x + 121)$
$2x^2 - 44x + 242$

c) ↑ Not a positive.
You cannot get a perfect square that is a negative.
$(-6)(-6) = 36$
$(+6)(+6) = 36$
Cannot factor.
- no common factors
- not a perfect square trinomial

5.4 Factoring Special Trinomials

Ex 1: Difference of Squares

Looks Like: 2 perfect squares being subtracted

Factorization: $a^2 - b^2$

$(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$

Ex 2: Perfect Square Trinomials.

Looks Like: $ax^2 + bx + c$

where a + c are perfect squares

b equals $[(\sqrt{a})(\sqrt{c})] \times 2$

*Reminder, square roots can be positive/negative.

b can be positive or negative

a + c must be positive.

Factorization: $(\sqrt{a}x \pm \sqrt{c})^2$