Difference of Squares:

A difference of squares is the difference of two perfect square terms

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

Perfect Square Trinomial

The trinomial that results from squaring a binomial is called a perfect square trinomial. Notice the first and last terms are perfect squares, and the middle term is twice the product of the square roots of the first and last terms.

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

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

Example 1: Expand each of the following

a) $(x - 3)(x + 3)$ DOS

Method 1: FOIL

$= x^2 + 3x - 3x - 9$

$= x^2 - 9$

Method 2: DOS Formula

$= (x)^2 - (3)^2$

$= x^2 - 9$

b) $(3x + 1)(3x - 1)$ DOS

$= (3x)^2 - (1)^2$

$= 9x^2 - 1$

c) $(4x^2 - 3y)(4x^2 + 3y)$ DOS

$= (4x^2)^2 - (3y)^2$

$= 16x^4 - 9y^2$

d) $(x + 4)^2$ PST

Method 1: Foil

$= (x+4)(x+4)$

$= x^2 + 4x + 4x + 16$

$= x^2 + 8x + 16$

Method 2: PST formula

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

$= x^2 + 8x + 16$

e) $(x - 5)^2$ PST

$= (x)^2 - 2(x)(5) + (5)^2$

$= x^2 - 10x + 25$

f) $(3x + 2)^2$ PST

$= (3x)^2 + 2(3x)(2) + (2)^2$

$= 9x^2 + 12x + 4$

Example 2: Factor each of the following

a) $x^2 - 36$ DOS

$= (x)^2 - (6)^2$

$= (x-6)(x+6)$

b) $x^2 + 14x + 49$ PST

<u>Method 1: Sum/Product</u>

$= x^2 + 14x + 49$ $\underline{7} + \underline{7} = 14$
                      $\underline{7} \times \underline{7} = 49$

$= (x+7)(x+7)$

$= (x+7)^2$

<u>Method 2: PST Formula</u>

$= x^2 + 2(x)(7) + (7)^2$

$= (x+7)^2$

c) $16x^2 - 25$ DOS

$= (4x)^2 - (5)^2$

$= (4x-5)(4x+5)$

d) $x^2 - 20x + 100$ PST

$= (x)^2 - 2(x)(10) + (10)^2$

$= (x-10)^2$

e) $4x^2 - 9y^2$ DOS

$= (2x)^2 - (3y)^2$

$= (2x-3y)(2x+3y)$

f) $x^2 - 8xy + 16y^2$ PST

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

$= (x-4y)^2$