

TOPIC: FACTORING SPECIAL PRODUCTS

Difference of Squares

◆ Recall: Multiplying the sum & difference of 2 terms (conjugates) results in:

Recall

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

(Difference of squares)

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Name	Rule	Use if there are...	Example
Difference of Squares	$a^2 - b^2 = (\quad + \quad)(\quad - \quad)$	____ terms that: • are perfect ____ • have ____ signs	$x^2 - 4$ $= (\quad)^2 - (\quad)^2$ $= (\quad + \quad)(\quad - \quad)$

◆ Note: $a^2 + b^2$ is NOT a difference of squares, but a **sum**, and it ____ be factored.

EXAMPLE

Factor each binomial.

(A) $16 - 9x^2$

(B) $y^2 + 25$

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PRACTICE

Write the following difference of squares as a product of two binomials.

(A) $k^2 - 49$

(B) $81 - G^2$

EXAMPLE

Completely factor the binomial.

(A) $x^4 - 16$

(B) $-150 + 6x^2$

(C) $12y^2 - 27x^2$

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Perfect Square Trinomials

♦ Recall: Squaring a binomial results in a perfect square trinomial:

Recall

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

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

Name	Rule	Use if there are...	Example
Perfect Square Trinomials	$a^2 + 2ab + b^2 = (a + b)^2$	____ terms in which: • first & last terms are perfect ____ (always positive) • middle term is ____	$x^2 + 10x + 25$ $= (\quad)^2 + 2(\quad)(\quad) + (\quad)^2$ $= (\quad)^2$
	$a^2 - 2ab + b^2 = (a - b)^2$		

EXAMPLE

Factor completely.

$4x^2 - 36x + 81$

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PRACTICE

Factor completely.

(A) $x^2 - 40x + 400$

(B) $4m^2 + 20m + 25$

PRACTICE

Factor completely. *Hint: Factor out the GCF first.*

(A) $12x^2 + 48x + 48$

(B) $-4y^3 - 24y^2 - 36y$

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EXAMPLE

Multiply the polynomials.

$$(A) \quad (a + b) (a^2 - ab + b^2)$$

$$(B) \quad (a - b) (a^2 + ab + b^2)$$