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.

$(\boldsymbol{A})$

$k^2 - 49$

$(\boldsymbol{B})$

$81 - G^2$

EXAMPLE Completely factor the binomial.

$(\boldsymbol{A})$

$x^4 - 16$

$(\boldsymbol{B})$

$-150 + 6x^2$

$(\boldsymbol{C})$

$12y^2 - 27x^2$

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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	$a^2 + 2ab + b^2 = (a \quad b)^2$ $a^2 - 2ab + b^2 = (a \quad b)^2$	___ terms in which: • first & last terms are perfect ___________ (always positive) • middle term is ______	$x^2 + 10x + 25$ $= (\quad)^2 + 2(\quad)(\quad) + (\quad)^2$ $= (\qquad)^2$

EXAMPLE Factor completely.

$4x^2 - 36x + 81$

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PRACTICE Factor completely.

$(\boldsymbol{A})$

$x^2 - 40x + 400$

$(\boldsymbol{B})$

$4m^2 + 20m + 25$

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

$(\boldsymbol{A})$

$12x^2 + 48x + 48$

$(\boldsymbol{B})$

$-4y^3 - 24y^2 - 36y$

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EXAMPLE Multiply the polynomials.

$(\boldsymbol{A})$

$$(a+b)\,(a^2-ab+b^2)$$

$(\boldsymbol{B})$

$$(a-b)\,(a^2+ab+b^2)$$