Name: _____ Date: _____ Hour: ___Alg 1___

Unit 7C Day 33: Factoring a Difference of Squares (Special Case of Factoring)

Focus Question: How do I quickly factor a special case?

A. Use the following expressions

$x^2 - 6$ $0^2-4(1)(-6)$ $0+24$ 24

$x^2 - 25$ $0^2-4(1)(-25)$ $0+100$ 100

$4x^2 - 36$ $0^2-4(4)(-36)$ $0+576$ 576

$x^2 + 16$ $0^2-4(1)(16)$ $0-64$ -64

1. What do all 4 expressions have in common?

binomials x^2 the b is 0

2. Only two of the expressions can be factored, which two? x^2-25 and $4x^2-36$

3. Factor those two expressions.

b^2-4ac

$x^2-5x+5x-25$

$x(x)+x(-5)+5(x)+5(-5)$

$x(x-5)+5(x-5)$

$(x-5)(x+5)$

$-5+5$

-25

$1\cdot25$

$5\cdot5$

$4(x^2-9)$

$4(x^2+3x-3x-9)$

$4[x(x+3)-3(x+3)]$

$4(x+3)(x-3)$

-9

$1\cdot9$

$3\cdot3$

$-3+3$

1. What do those two original expressions have in common?

- quad. binomials b=0
- c is a negative prft sq.
- a is also a prft sq.

2. What do the two factored expressions have in common?

$(x+\#)(x-\#)$

B. Difference of squares

The two expressions $x^2 - 25$ and $4x^2 - 36$ are examples of a special case called "The difference of squares." Meaning it could always be re-written as $a^2 - b^2$ and its factors will always be $(a+b)(a-b)$. Factor each of the following. (Remember, the first thing you should always look for is the GCF.

1. $x^2 - 144$

x^2-12^2

$(x-12)(x+12)$

2. $k^2 - 225$

k^2-15^2

$(k-15)(k+15)$

3. $9x^2 - 1$

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

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

4. $4n^2 - 49$

$(2n)^2 - 7^2$

$(2n-7)(2n+7)$

5. $3n^2 - 75$

$3(n^2-25)$

$3(n^2-5^2)$

$3(n-5)(n+5)$

6. $24x^3 - 54x$

$6x(4x^2-9)$

$6x[(2x)^2-3^2]$

$6x(2x-3)(2x+3)$

7. $a^2 - 25b^2$

$a^2-(5b)^2$

$(a-5b)(a+5b)$

8. $4x^2 + 49y^2$

no shortcut!
does not factor

9. $\frac{1}{4}s^2 - 1$

$(\frac{1}{2}s)^2 - 1^2$

$(\frac{1}{2}s-1)(\frac{1}{2}s+1)$

C. The difference between factoring and solving — Reverse PEMDAS

Just because an expression can't be factored doesn't mean it can't be solved! Remember, you have other methods like quadratic formula or complete the square.

1. Factor $a^2 + 16$

will not factor!

2. Solve $a^2 + 16 = 0$

$-16 \quad -16$

$\sqrt{a^2} = \sqrt{-16}$

$a = \pm 4i$

16
^
16..-1

3. Factor $b^2 - 12$

will not factor!

4. Solve $b^2 - 12 = 0$

$+12 \quad +12$

$\sqrt{b^2} = \sqrt{12}$

$b = \pm 2\sqrt{3}$

12
^
4.3

5. Factor $d^2 + 2d - 1$

will not factor

6. Solve $d^2 + 2d - 1 = 0$

$+1 \quad +1$

$d^2+2d+1 = 1+1$

$(d+1)^2 = \sqrt{2}$

$d+1 = \pm\sqrt{2}$

$-1 \quad -1$

$d = -1 \pm \sqrt{2}$