Sept 5/2013

Review - Part 3

Factoring Quadratic Relations

Jan 31-2:27 PM

Standard Form

$$y = ax^2 + bx + c$$

factor

expand & simplify

expand & simplify

complete the square

Factored Form

$$y = a(x-s)(x-t)$$

Vertex Form

$$y = a(x-h)^2 + k$$

Feb 2-6:19 PM

Review - Part 3

Factoring Quadratic Relations

Sept 5/2013

A. Common Factors

* always look for common factors first!

Look for the greatest common factor of the coefficients and the GCF of the variables.

Ex.1 Factor: $8x^3 - 6x^2y^2 + 4x^2y$

$8x^3 = \cancel{2}\cdot 2\cdot 2\cdot \cancel{x}\cdot \cancel{x}\cdot x$

$6x^2y^2 = \cancel{2}\cdot 3\cdot \cancel{x}\cdot \cancel{x}\cdot y\cdot y$

$4x^2y = \cancel{2}\cdot 2\cdot \cancel{x}\cdot \cancel{x}\cdot y$

GCF $= 2\cdot x\cdot x$

$= 2x^2$

$\frac{x^3}{x^2} = \frac{\cancel{x}\cdot\cancel{x}\cdot x}{\cancel{x}\cdot\cancel{x}}$

$= x$

$8x^3 - 6x^2y^2 + 4x^2y$

$= 2x^2\left(\frac{8x^3}{2x^2} - \frac{6x^2y^2}{2x^2} + \frac{4x^2y}{2x^2}\right)$

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

Mar 26-8:24 AM

B. Common Factors by Grouping

Some polynomials do not have common factors in all terms. They can sometimes be factored by grouping terms with common factors.

Ex.2 Factor: $\underbrace{ac + bc}_{c \text{ common}} + \underbrace{ad + bd}_{d \text{ common}}$

$= c\underbrace{(a+b)}_{e} + d\underbrace{(a+b)}_{e}$

$= ce + de$

$= e(c+d)$

$= (a+b)(c+d)$

Mar 26-8:24 AM

C. Factoring Trinomials ($ax^2 + bx + c$)

What is the relationship between the coefficients of each term in the expression? Use this information to decompose the middle term into two pieces, then factor by grouping.

Ex.3 Factor: $1x^2 - 5x + 6$

Sum : -5

Product : $1 \times 6 = 6$

Integers: $-2, -3$

$$x^2 - 5x + 6$$

$$= \underbrace{x^2 - 2x}\ \underbrace{- 3x + 6}$$

$$= x(\underline{x-2}) - 3(\underline{x-2})$$

must be the same!

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

Mar 26-8:24 AM

Ex.4 Factor $3x^2 + 7x + 2$

S 7

P 6

I 6, 1

$$= 3x^2 + 6x + x + 2$$

$$= 3x(x+2) + 1(x+2)$$

$$= (x+2)(3x+1)$$

Feb 1-7:13 PM

D. Factoring Special Quadratics (by patterns)

Perfect Squares: $a^2 + 2ab + b^2 = (a+b)^2$

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

Difference of Squares: $a^2 - b^2 = (a-b)(a+b)$

S 0
P −3600
I −60, 60

S 24
P 144
I 12, 12

Ex.5

(a) $25d^2 - 144$

$= (5d)^2 - (12)^2$

$= (5d-12)(5d+12)$

(b) $16x^2 + 24xy + 9y^2$

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

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

(c) $18p^2q - 60pq + 50q$

(d) $98a^2 - 32b^2$

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Ex.5 (continued)

(c) $18p^2q - 60pq + 50q$

(d) $98a^2 - 32b^2$

Sep 4-8:49 PM

Homework:

p.3 # 4odd, 5odd, 6odd

4ace... 5ace... 6ace...

6a, 5e
g
k
e

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5(e) w^2-81

S 0
P -81
I 9, -9

$=w^2+0w-81$

$=w^2+9w-9w-81$

$=w(\underline{w+9})-9(\underline{w+9})$

$=(w+9)(w-9)$

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

Sep 6-9:10 AM

6(d) $2x^2+7x+3$

S 7
P 6
I 1,6

$=2x^2+x+6x+3$

$=x(2x+1)+3(2x+1)$

$=(2x+1)(x+3)$

(e) $6x^2+x-1$

S 1
P −6
I 3,−2

$=6x^2+3x-2x-1$

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

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

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6(g) $9a^2-16$

$=(3a)^2-(4)^2$

$=(3a-4)(3a+4)$

6(k) $3x^2+7x-20$

S 7
P −60
I 12,−5

$=3x^2+12x-5x-20$

$=3x(x+4)-5(x+4)$

$=(x+4)(3x-5)$

Sep 6-9:16 AM