COMMON FACTORING

LEARNING GOALS

- Learn how to factor quadratic expressions.

REVIEW

EXPAND THE FOLLOWING

$3(x+2)$

$= 3x + 6$

$5y(y+3)$

$5y^2 + 15y$

$3x^2(x^2+2xy+3y^2)$

$= 3x^4 + 6x^3y + 9x^2y^2$

MONOMIAL FACTORING

Factoring is the reverse of Expanding.

FACTOR THE FOLLOWING

$3x+6$

3x: 3 · 1 · x; 6: 3 · 2

$3(x+2)$

$10y^2+15y$

10y²: 5 · 2 · y · y; 15y: 5 · 3 · y

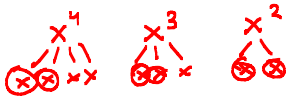
$5y(2y+3)$

$3x^4+6x^3y+9x^2y^2$

$3 | x^4+2x^3y+3x^2y^2$

$3x^2 | x^2+2xy+3y^2$

$3x^2(x^2+2xy+3y^2)$



The objective when factoring is to find the GCF or greatest common factor.

FIND THE GCF AND FACTOR

$12x^4 + 32x^2$

12 → 4, 3 ; 32 → 8, 4

$4 \mid 3x^4 + 8x^2$

$4x^2 \mid 3x^2 + 8$

$4x^2(3x^2 + 8)$

$7x^2y^4 + 28x^2y^3$

$7 \mid x^2y^4 + 4x^2y^3$

$7x^2 \mid y^4 + 4y^3$ (y^4 → 4, 4)

$7x^2y^3 \mid y + 4$ (y^3 → 4, 4)

$7x^2y^3(y + 4)$

BINOMIAL COMMON FACTORS

Consider the following expression we want to factor,

$$3x(y+1) + 7z(y+1)$$

The common factor between both products is,

$(y+1)$

So, to factor this we get,

$(y+1) \mid 3x + 7z$

$(y+1)(3x + 7z)$

FACTOR THE FOLLOWING

$2(x+2) + y(x+2)$

$(x+2) \mid 2 + y$

$(x+2)(2+y)$

$4x(y-2) + 6x(y-2)$

$(y-2) \mid 4x + 6x$

$(y-2)(4x + 6x)$

$(y-2)\ 10x$

$10x(y-2)$

$4x(3x-2) - 2(3x-2)$

$(3x-2)(4x-2)$

FACTOR BY GROUPING

This technique becomes useful when you notice a polynomial with multiple terms and/or variables. To do this method, you group together terms in your polynomial that share a common factor.

EXAMPLES

$ax + ay + 2x + 2y$

$a|x + y + 2|x + y$

$a(x+y) + 2(x+y)$

$(x+y)|a + 2$

$(x+y)(a+2)$

$3mx + 3my + 2x + 2y$

$3m|x + y + 2|x + y$

$3m(x+y) + 2(x+y)$

$(x+y)|3m + 2$

$(x+y)(3m+2)$

$6x^2 + 9x - 2x - 3$

$3x|2x+3 - 1|2x+3$

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

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

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

HOMEFUN ☺

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