

A. FACTORING POLYNOMIALS

LEARNING GOAL: I will factor polynomials correctly.

HW: p. 102 #1-6 (p. 107 #6-10)

xy^2

There are 4 things to look for when factoring:

- ✓ 1) Common Factor
- ✓ 2) Difference of Squares
- ✓ 3) Simple Trinomial
- ✓ 4) Complex Trinomial

$1x^2 + 4x + 4$ $2x^2 + 8x - 12$

1) COMMON FACTOR

- find the common largest number and variable combination that go into each term
- divide each term by the common factor

Ex. Factor $6x^3 - 12x^2 + 24x$

Solution:

GCF = $6x$ $\left(\frac{6x^3}{6x} - \frac{12x^2}{6x} + \frac{24x}{6x} \right) = 6x(x^2 - 2x + 4)$

2) DIFFERENCE OF SQUARES

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

- when $a^2 - b^2$, the two factors are $(a + b)$ and $(a - b)$

Ex. Factor $36x^2 - 49y^2$

Solution:

$144x^4 - 169y^9 = (6x^2)^2 - (7y^2)^2 = (6x^2 + 7y^2)(6x^2 - 7y^2)$

3) SIMPLE TRINOMIAL

$x^2 + 2x + 4$

- when $x^2 + Bx + C$, i.e. the coefficient of the x^2 term is 1
- find 2 numbers, p and q, that multiply to C and add to B (MAN = Multiply Add Numbers)
- the two factors are $(x + p)$ and $(x + q)$

Ex1. Factor $x^2 + 5x + 6$
two numbers that multiply to 6 and add to 5 are:
Solution: $x^2 + 5x + 6 = (x + 2)(x + 3)$

M: $1 \times 6 = 6$
A: 5
N: 2 and 3

Ex2. Factor $x^2 - 6x - 7$
two numbers that multiply to -7 and add to -6 are:
Solution: $x^2 - 6x - 7 = (x + 1)(x - 7)$

M: $1 \times -7 = -7$
A: -6
N: +1 and -7

4) COMPLEX (TRICKY) TRINOMIAL

$6x^2 - x - 12$

Ex. Factor $6x^2 - x - 12$

$(6x + 8)(x - 3)$
 $(3x + 4)(2x - 3)$

M: $6x - 12 = -72$
A: -1
N: 8, -9

B. SOLVING EQUATIONS

- when $Ax^2 + Bx + C = 0$, i.e. the right hand side = 0
- you may have to rearrange the equation so that the right hand side is 0
- factor, if possible, then set each factor = 0 to find the value of x that solves the equation

- if factoring is not possible, use the quadratic formula:

$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$

Ex1. Solve $x^2 + 3x + 2 = 0$

$(x + 1)(x + 2) = 0$

$x + 1 = 0$
 $x = -1$

$x + 2 = 0$
 $x = -2$

The solution is $x = -1, x = -2$



Ex2. Solve $2x^2 - 7x - 4 = 0$

$(2x + 1)(x - 4) = 0$

M: $2x - 4 = -8$
A: -7
N: 1, -8

$(2x + 1)(x - 4) = 0$

Ex3. Solve $2x^2 + 3x + 4 = 5 - 2x$

$2x^2 + 3x + 4 + 2x - 5 = 0$
 $2x^2 + 5x - 1 = 0$

$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$