MATH 0270/1314 COLLEGE ALGEBRA Week 6 Monday 2/25/19.

EXTRA CREDIT.

- Fri. 2pm. Lucas. 119.

FACTORING: represent an expression (product) as multiplications of FACTORS ↳ NOT ADDITION

From Polynomial Multiplication.

$2x^2(3x^2-5x+7)$

$= 6x^{4}-10x^{3}+14x^{2}$

$= 2x^2(3x^2-5x+7)$ (2)

(1) Common Factor.

- look at the coefficient and find a common factor
- find the variable that is in every term (x^2)

★ this is the opposite of distributive law

e.g. (1) $6n^3+24n^2+12n$

$=6n(n^2+4n+2)$

(2) $a(b-2)+c(b-2)$

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

※ make sure your factors are in parenthesis.

(3) $18a^2b-15ab^2$

$=3ab(6a-5b)$

※ ALWAYS FACTOR OUT THE LARGEST COMMON FACTOR.

(2) Grouping

- steps
  - ① group the terms in pairs base on seeing the common things
  - ② factor out the common factor in each pair.
  - ③ further factor out the common binomial
- If you have four terms, the first thing you should try is "GROUPING".

e.g. (1) $x^3+3x^2+6x+18$

$=(x^3+3x^2)+(6x+18)$

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

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

(2) $2x^3-3x^2+6x-9$.

$=(2x^3+6x)+(-3x^2-9)$

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

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

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

$=(2x^3-3x^2)+(6x-9)$

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

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

(3) a^3-3a^2-2a+6

$=(a^3-3a^2)+(-2a+6)$

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

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

a^3-3a^2-2a+6

$=(a^3-2a)+(-3a^2+6)$

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

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

"COMMUTATIVE PROPERTY OF MULTIPLICATION"

$ab=ba$

$a+b=b+a$ > order doesn't matter for addition/multiplication.

Techniques in Factoring Polynomials

I. Always factor out the largest common factor first.

A. $6n^3 + 24n^2 + 12n$

$= 6n(n^2 + 4n + 2)$

↳ $6n$ is in at least every term.

B. $a(b - 2) + c(b - 2)$

$= (b-2)(a + c)$ → $(b-2)$ is in at least every term.

C. $18a^2b - 15ab^2$

$= 3ab(6a - 5b)$

↓

great numeric common factor.

each have at least a^1

each have at least b^1

II. Consider factoring by grouping.

A. $x^3+3x^2+6x+18$

$=(x^3+3x^2)+(6x+18)$

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

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

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

$=(2x^3+6x)-3x^2-9$

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

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

C. a^3-3a^2-2a+6

$=(a^3-3a^2)+(-2a+6)$

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

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