

Math 0995 CBE 2 Review

UtahStateUniversity®

CBE 2

Covers lessons 7-13

Polynomials

Multiplying/
Dividing
Polynomials

Factors and
the GCM

Factor by
Grouping

Factoring
Trinomials

“Special”
Factoring
Formulas

Problem 1

- Subtract the polynomials and simplify the expression:

$$(5m^5 + 4m^3 - m) - (2m^2 + 6m - 7)$$

Solution: $5m^5 + 4m^3 - 2m^2 - 7m - 7$

Polynomials

A polynomial is an expression made up of coefficients, variables, and exponents.

To add polynomials,
combine the like terms.

$$\begin{aligned}(5x^2 + 3x + 1) + (2x^2 + 3) \\&= (5x^2 + 2x^2) + 3x + (1 + 3) \\&= 7x^2 + 3x + 4\end{aligned}$$

To subtract polynomials,
combine the like terms.

$$\begin{aligned}(5x^2 + 3x + 1) - (2x^2 + 3) \\&= (5x^2 - 2x^2) + 3x + (1 - 3) \\&= 3x^2 + 3x - 2\end{aligned}$$

Problem 2

- Determine the value of the polynomial when $x = 2$:

$$3x^2 + 6x - 10$$

Solution: 14

Problem 3

- Multiply and simplify the expression:

$$(4y^2 + 10)(3y^2 + 2y - 1)$$

Solution: $12y^4 + 8y^3 + 26y^2 + 20y - 10$

Multiplying Polynomials

When multiplying polynomials, we use the distributive property.

Binomial · Binomial Example:

$$(e + f)(g + h) = e(g + h) + f(g + h) = eg + eh + fg + fh$$

Problem 4

- What is the area of a rectangle with a width = $4x - 6$ and a length = $2x + 9$

Solution: $A = 8x^2 + 24x - 54$

Problem 5

- Divide and simplify the following expression:

$$\frac{8x^5 + 6x^2 + 5}{4x^4}$$

Solution: $2x + \frac{3}{2x^2} + \frac{5}{4x^4}$

Dividing Polynomials by a Monomial

To divide a polynomial by a monomial:

$$\frac{6x^5 - 2x^3 + 8}{2x^2}$$



Divide into each term in the numerator

$$\frac{6x^5}{2x^2} - \frac{2x^3}{2x^2} + \frac{8}{2x^2}$$



Simplify each term

$$3x^3 - x + \frac{4}{x^2}$$

Problem 6

- Use polynomial division to divide the following expression:

$$\frac{2x^3 + 4x^2 - 6}{x + 1}$$

Use polynomial division to divide the expression $\frac{2x^3 + 4x^2 - 6}{x+1}$

Solution: $2x^2 + 2x - 2 - \frac{4}{x+1}$

Dividing Polynomials by Polynomials

$$\begin{array}{r} 2x^2 + 5x + 4 \\ x - 2 \overline{) 2x^3 + x^2 - 6x - 8} \\ \underline{-(2x^3 - 4x^2)} \downarrow \\ 0 + 5x^2 - 6x \\ \underline{-(5x^2 - 10x)} \\ 0 + 4x \\ (4x - 8) \end{array}$$

Divide



Multiply



Subtract



Repeat

Problem 7

- Fully factor the following polynomial:

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

Solution: $(x - 2)(x - 3)$

Factoring Trinomials

Write in descending order:

$$x^2 + 6x + 8$$



Find factors of the last term that add to the middle term:

$$(x + 2)(x + 4)$$

Problem 8

- Fully factor the following polynomial:

$$6x^2 + 11x - 10$$

Solution: $(3x - 2)(2x + 5)$

What if the leading coefficient is not 1?

$$2x^2 + 12x + 10$$

Try factoring the coefficient:

$$2(x^2 + 6x + 5)$$

Then factor:

$$2(x + 1)(x + 5)$$

$$6x^2 + 11x + 4$$

If not, find factors of the leading coefficient that multiplied by factors of the last term add to the middle term:

$$(3x + 4)(2x + 1)$$

Problem 9

- Fully factor the following polynomial:

$$6xy + 30y - 4x - 20$$

Solution: $(x + 5)(6y - 4)$

Factor By Grouping

To factor by grouping:

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

Group terms into pairs

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

Factor each group

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

Factor out the common binomial

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

Problem 10

- Fully factor the following polynomial:

$$12x^5 - 18x^4 + 6x^3$$

Solution: $6x^3(2x - 1)(x - 1)$

Other Resources

Aggie Math Learning Center

- Visit usu.edu/math/amlc for more videos, resources, tutoring times, and recitation leader office hours

