

Quick Review Sheet for Math 0302

Summary of Exponent Rules and Definitions

Let b be any real number, n any natural number.

$$1. b^0 = 1 \ (b \neq 0) \quad 2. b^1 = b$$

$$3. b^n = b \cdot b \cdot \dots \cdot b \cdot b \quad 4. b^{-n} = \left(\frac{1}{b}\right)^n = \frac{1}{b^n}$$

Let x and y be real numbers such that $x \neq 0, y \neq 0$ and m and n are integers.

$$5. \text{Product Rule: } x^m \cdot x^n = x^{m+n}$$

$$6. \text{Power-to-Power Rule: } (x^m)^n = x^{m \cdot n}$$

$$7. \text{Product-to-a-Power Rule: } (xy)^m = x^m \cdot y^m$$

$$8. \text{Quotient Rule: } \frac{x^m}{x^n} = x^{m-n}$$

$$9. \text{Quotient-to-a-Power Rule: } \left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$$

$$10. \text{Sign-Change Rule: } \frac{x^{-m}}{y^{-n}} = \frac{y^n}{x^m}, \text{ where } m \text{ and } n \text{ are natural numbers}$$

The General Factoring Strategy

- Factor out the GCF.
- If there are four terms, try to factor by grouping.
- If there are two terms, determine if they constitute a special form of a binomial. (Look at table below)
- If there are three terms, use the AC Method to factor.
- Examine the answer to be certain you cannot factor any further.
- Check the answer using multiplication.

Factorable	Prime
Difference of Squares: $a^2 - b^2 = (a + b)(a - b)$	Sum of Squares: $a^2 + b^2$
Sum of Cubes: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$	
Difference of Cubes: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$	

Long Division of Polynomials

- Write both polynomials in descending order with all powers of the variable present (including a constant term). Add zeros as placeholders for any missing powers of the variable.
- Divide** the first term of the dividend by the first term of the divisor to determine the first term of the quotient. Place this on the quotient bar in the appropriate place.
- Multiply** the first term of the quotient by the *entire divisor* and place this product underneath the dividend.
- Subtract** by circling and changing all signs from step 3, and then follow the rules of addition.
- Bring down** the next term from the dividend and repeat steps 2 through 4. Continue to repeat until all terms of the dividend have been carried down, or until the remainder has a degree less than the degree of the divisor.
- Answer:** Quotient + $\frac{\text{Remainder}}{\text{Divisor}}$.
- Check:** Dividend = (Quotient)(Divisor) + Remainder

Adding and Subtracting Polynomials

- Use the Distributive Property to remove parentheses.
- Combine like terms by adding the like terms.
- Write the resulting polynomial in descending order of the powers of the variables, decreasing from left to right.