Math122 College Algebra

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P.6
Algebraic Expressions

- Examples of algebraic expressions

1. $4a^3 + 2a + 1$
2. $5 + \sqrt[3]{x}$
3. $\frac{2y}{y^3 - 2}$

- Remember, variables such as a, x, and y just represent any number from a given set of numbers

Polynomials

- A monomial is an expression of the form ax^k where a is a real number an k is a non-negative integer
- A binomial is the sum of two monomials
- A trinomial is the sum of three monomials
- A polynomial is a sum of monomials

State whether each expression from the previous slide is a monomial, binomial, trinomial, polynomial, or none of the aforementioned

Polynomials

- A polynomial is of the form:
  - $a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$ where $a_0, a_1, \ldots, a_n$ are real numbers and n is a nonnegative integer.
  - if $a_n \neq 0$ then the polynomial has **degree** n
  - the **terms** of the polynomial are monomials of the form $a_k x^k$

Problem

Polynomial	Type	Terms	Degree
$3x^4 - 5x^2 + 7$			
$10y^2$			
1			
$5y + y^4$			

Note: The Type is monomial, binomial, trinomial, four terms, five terms, …

Polynomial Addition & Subtraction

- We add and subtract polynomials by combining like terms
- Find the sum of

$$(y^4 - 3y^2 + 7) + (4y^4 + y^3 + 2y^2 - 1)$$

- Find the difference of

$$(y^4 - 3y^2 + 7) - (4y^4 + y^3 + 2y^2 - 1)$$

Multiplying Algebraic Expressions

- In general,
  $(a + b)(c + d) =$
- Find
  1. $(3y + 1)(4y - 2)$

  2. $(2z + 4)(z^2 - 2z + 1)$

Special Product Formulas

1. $(A+B)(A-B)=$
2. $(A+B)^2=$
3. $(A-B)^2=$
4. $(A+B)^3=$
5. $(A-B)^3=$

Problem

- Use the special product formulas to find each of the following. In each case, what is A and what is B?

1. $(2x + 3)^2$

2. $(y^2 - 2)^3$