Lesson 10

Introduction to Polynomials

Lesson

A polynomial is an expression with one or more terms, where each term is a number times a variable raised to a whole-number exponent.

Examples:

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    3x^2 + 5x - 7     (a trinomial -- 3 terms)
    4y - 1             (a binomial -- 2 terms)
    6x^3               (a monomial -- 1 term)
```

The degree of a polynomial is the highest exponent.

To add or subtract polynomials, combine like terms.
To multiply a monomial by a polynomial, use the distributive property.

Example: Add (3x^2 + 2x - 5) + (x^2 - 4x + 8)

Group like terms:

```
    x^2 terms:  3x^2 + x^2  = 4x^2
    x terms:    2x + (-4x)  = -2x
    constants:  -5 + 8       = 3
```

Result: 4x^2 - 2x + 3

Practice Problems

1) Add: (2x^2 + 3x + 1) + (x^2 - x + 4)

2) Subtract: (5y^2 + 2y) - (3y^2 - y + 6)

3) Multiply: 3x(x^2 + 4x - 2)

4) What is the degree of 7a^3 - 2a^2 + a - 9 ?

5) Simplify: (4m^2 - m + 3) + (2m^2 + 5m - 7)

6) Simplify: 2x(3x + 5) - x(x - 1)

7) A rectangle has length (x + 3) and width (2x - 1).
Write an expression for its area and expand it.

8) Add: (x^3 - 2x + 5) + (3x^3 + x^2 - 4)

9) Subtract: (6a^2 - 3a + 8) - (2a^2 + 5a - 1)

10) What is the degree of $4x^5 - 3x^2 + 7$?

11) How many terms does $3x^4 - x^2 + 5x - 2$ have?
What type of polynomial is it?

12) Multiply: $-4y(2y^2 - 3y + 1)$

13) Multiply: $2a^2(a^3 - 5a + 3)$

14) Simplify: $(3x^2 - x + 4) - (x^2 - 3x - 2)$

15) Simplify: $3(x^2 + 2x - 1) + 2(x^2 - x + 4)$

16) Evaluate 2x^2 - 3x + 1 when x = 4.

17) A square has side length (x + 2).
Write and expand an expression for its area.

18) Simplify: (5y^3 + 2y^2 - y) + (y^3 - 4y^2 + 3y + 6)
- (2y^3 - y + 1)

19) Is 3x^(-2) + 5 a polynomial? Explain why or why not.

20) A ball's height in feet is h = -16t^2 + 48t + 5,
where t is time in seconds.
Find h when t = 1 and when t = 2.