**Barron’s Let’s Review Regents – Algebra I**

# Chapter 2: Polynomic Arithmetic

## 2.1 Classifying Monomials, Binomials, and Trinomials

An expression like has two terms while has three terms. Expressions with only one term are called *monomials*. Expressions with two terms are called *binomials*. Expressions with three terms are called *trinomials*. They are all special types of *polynomials*.

### Determining the Type of a Polynomial by the number of terms

Example 1

6x - 2 has two terms and is a *binomial*.

Example 2

5x2 has no plus or minus signs, and is one term. It is a *monomial*.

### The Degree of a Polynomial

When the terms of a polynomial have exponents on the variables, the *degree* of a polynomial is the largest exponent that a variable is raised to. The binomial 2x5 + 3x is degree 5 since the largest exponent is 5. The trinomial 3x2 -7x + 3 is degree 2. A monomial like 7 is degree 0, since it is the equivalent of 7x0.

#### Math Facts

* A polynomial with a degree of 0 is called a *constant polynomial*.
* A polynomial with a degree of 1 is called a *linear polynomial*.
* A polynomial with a degree of 2 is called a *quadratic polynomial*.
* A polynomial with a degree of 3 is called a *cubic polynomial*.

### Check Your Understanding of Section 2.1

1. Multiple Choice
2. Classify the polynomial 5x2 + 3.  
   (2) Binomial
3. Classify the polynomial 7x2 -3 + 2.  
   (3) Trinomial
4. Classify the polynomial 3x3.  
   (1) Monomial
5. Classify the polynomial 3x2y + 5xy2.
6. Classify the polynomial 3x3 + 5x2 + 7x -3.  
   (4) None of the above.
7. Classify the polynomial 3x2 -7x + 5.  
   (3) Trinomial
8. Which of the following is a binomial?  
   (3) 5x2 + 2
9. Which of the following is a trinomial?  
   (3) 2x2 + 5x + 3
10. What is the degree of the polynomial 5x2 + 7x3 -2x?  
    (4) 3
11. Which of the following is a quadratic trinomial?  
    (3) 5x2 -3x + 8
12. Show how you arrived at your answers.
13. An expression for the height of a projectile is   
    -16t2 + 72t + 5. What kind of polynomial is this and what is its degree?  
      
    This has three terms and is a trinomial.  
    The highest exponent is 2. Therefore the degree is 2 and it is called a quadratic polynomial.
14. An equation for the amount of profit a company makes is 5q – 800. What kind of polynomial is that and what is its degree?  
      
    This is a binomial since it has two terms. The degree is one because its largest exponent is 1 (x1) it is called a linear polynomial.
15. Coss out one of the terms in this polynomial to make it into a third-degree trinomial:   
    5x3 + 2x2 -7x + 9.  
      
    5x3 + 2x2 -7x ~~+ 9~~
16. Create a fourth-degree monomial.  
      
    5x4
17. Mark says that the expression 2 + 3 is a binomial since it has two terms. Layla says that it is a monomial since 2 + 3 = 5, and 5 is just one term. Who is correct?  
      
    Technically 2 + 3 is a binomial since it has two terms. 5 is a monomial since it has only one term. Layla is slightly incorrect when disputing it being a binomial.

## 2.2 Multiplying and Dividing Monomials

A monomial, like 5x3, has a coefficient of 5 and a variable part of x3. Just as numbers can be multiplied together, monomials can be multiplied. When multiplying monomials, you have to use the rules for exponents.

What is a coefficient? A coefficient is a number that is multiplied by a variable.

### Multiplying Expressions Involving Exponents

To multiply two monomials, multiply the two coefficients, and multiply the variable parts using the exponent multiplication shortcut of adding the exponents.

**Example 1**

Simplify x2 \* x3 : x5

### Multiplying Monomials That Have Coefficients and Variable Parts

**Example 2**

Simply 3x2 \* 5x3   
(3\*5) \* x2 \* x3 = 15x5

**Example 3**

Simplify 3x4 \* 4x = (3 \* 4) \* x4 \*x = 12x5

**Example 4**

Simplify 2x5 \* 3x4 \* 5x3 = (2\*3\*5) \* x5+4+3 = 30x12

**Example 5**

Simplify 4x2y \* 7xy3 = (4\*7) \* (x2 \* x) \* (y \* y3) =  
28x3y4

**Math Facts**

### Dividing Monomials

To divide two monomials, divide the two coefficients and subtract the exponent of the divisor from the exponent of the dividend.

Example 6

Simplify

### Check Your Understanding of Section 2.2

1. Multiple Choice
2. Multiply 3x3 \* 4x5(3) 12x8
3. Multiply 2x5 \* 5x  
   (1) 10x6
4. Which of the following would not simplify to 12x6?  
   (4) 4x3 \* 3x2
5. Which of the following would not simplify to 24x5?  
   (4) 6x5 \* 4x
6. Multiply x6 \* x.  
   (3) x7
7. Multiply 5 \* 3x5.  
   (2) 15x5
8. If 2x3y = 10x6, which expression is equivalent to y?  
   (2) 5x3
9. Multiply 3x5 \* 2x-2.  
   (3) 6x3
10. If 5x7z = 20x4, which expression is equivalent to z?  
    (4) 4x-3
11. Simplify (4x3)2.  
    (1) 16x6
12. Show how you arrived at your answers.
13. Alexa multiplies 4x2 \* 5x3 and saysthe answer is 20x6 since 4 \* 5 is 20 and 2 \* 3 is 6. Is she correct?  
      
    Coefficients are multiplied and exponents are added for the variable x. The correct answer is **20x5.**
14. What does 12x6 3x2 simplify to?  
    12x6 3x2 = (12 / 3) \* x6-2 = **4x4**
15. Joseph says that x0 = 0 since there are no x’s multiplied together. Sawyer says this is not correct. Who is right?  
      
    Sawyer is correct, because according to the “zero exponent rule”, any variable raised to the zeroth power is equal to 1 (one).
16. What is 5x2  2x-2? Explain your reasoning.  
      
    Coefficients are multiplied and exponents are added when simplifying monomials using the same variable.
17. When multiplying a quadratic monomial by a cubic monomial, what type of polynomial will result?  
      
    A quadratic monomial has degree 2 and a cubic monomial has degree 3. Therefore the multiplication will produce a **polynomial of degree 5**.