

Name: Key Date: _____ Period: _____

Unit 8 Review Sheet "Study Guide"

Classify Polynomials by terms and by degree.

Polynomial names based on number of terms:

| # of Terms | Name | Example |
|------------|------------|-------------------------|
| 1 | monomial | 36 |
| 2 | binomial | $x^2 + 3$ |
| 3 | trinomial | $2x^2 + 2x + 4$ |
| 4 or more | polynomial | $x^5 + 2x^4 - 3x^3 + x$ |

degree:

Polynomial names based on

The degree of a **monomial** is the sum of the exponents on the variables in that monomial. For example: $6x^3y^2z$: The degree of the monomial is 6, because $3 + 2 + 1 = 6$

The degree of a **polynomial** is the highest monomial degree.

For example: $3x^2y^3 - 14x^4 + 23$: The degree of the polynomial is 5 because the first term has a degree of 5, the second term has a degree of 4 and the third term has a degree of 0 → so 5 is the highest degree.

| Sum of Exponents | Degree of Polynomial Name | Example |
|------------------|---------------------------|---------------------------|
| 0 | constant | 45 |
| 1 | linear | $x + 1$ |
| 2 | quadratic | $3x^2 + 2$ |
| 3 | cubic | $x^3 + x - 3$ |
| 4 | quartic | $x^4 + 3x^2 - 2x$ |
| 5 | quintic | $5x^2y^3 - 4x^4 + 8x - 5$ |
| 6 or more | degree of 6 | $x^6 + 5x^2 - 4$ |

Write a Polynomial in Standard Form

A polynomial is written in Standard Form when the terms are in order of degree from greatest to least. If the degrees add up to the same amount, then arrange the terms alphabetically.

Example:

$$6x - 7x^5 + 4x^2 + 9$$

degree: 1 5 2 0

In Standard Form: $-7x^5 + 4x^2 + 6x + 9$

REMEMBER

ALWAYS TAKE THE SIGN WITH THE TERM!!!

A leading coefficient is the first coefficient of the polynomial when written in Standard Form.

Practice:

Classify the polynomials by degree and term:

1. $6z$ 2. $3z^5 - 4z + 13$ 3. $12v + 16v^4 + 3$ 4. $8st^3 + 8s^4t$
- Constant monomial quintic trinomial quartic trinomial quintic binomial

Write each polynomial in standard form, and then identify the leading coefficient:

5. $2n - 4 - 3n^3$
 $-3n^3 + 2n - 4$
 (-3)

6. $6h - 2 + 2h^7$
 $2h^7 + 6h - 2$
 (2)

7. $2a - a^4 - a^6 + 3a^3$
 $-a^6 - a^4 + 3a^3 + 2a$
 (-1)

Adding and Subtracting Polynomials

When adding or subtracting combine the like terms

Like Terms: monomials with the same variables raised to the same power. Examples of like terms:

- $2x$ and $-3x$ $4x^3y^2$ and $-2x^3y^2$

When adding or subtracting like terms, the only thing that will change is the **COEFFICIENT**

Practice:

8. $(2y^3 + 5y^2 - 6y) + (-5y^2 - 4y + 1)$

$2y^3 - 10y + 1$

9. $(8pr^2 + 6p - 1) + (-7p + 3)$

$-8pr^2 - p + 2$

10. $(-m^3 - m^2 - m - 2) - (-m^3 - m - 2)$

$-m^3 - m^2 - m - 2 + m^3 + m + 2$
 $-m^2$

11. $(8pr^2 + 6p - 1) - (-7p + 3)$

$8pr^2 + 13p - 4$

Multiplying Polynomials

To multiply monomials:

- multiply the coefficients
- multiply the variables with like bases...add the exponents

To multiply a polynomial by a monomial:

- distribute the monomial to each term in the polynomial
- multiply the coefficients
- multiply the variables with like bases...add the exponents

To multiply two binomials:

- First Outer Inner Last
- Combine like terms
- Write the answer in **STANDARD FORM**

To multiply a polynomial and a polynomial

- Choose the Distributive Method, the Rectangle Method, or the Vertical Method
- Combine Like Terms

Practice:

12. $(2y)(-5y^2 - 4y + 1)$

$$2y(-5y^2) + 2y(-4y) + 2y(1)$$

$$\underline{-10y^3 - 8y^2 + 2y}$$

14. $(-4x)(x^3 + 8x^2)$

$$-4x(x^3) + -4x(8x^2)$$

$$\underline{-4x^4 - 32x^3}$$

16. $(2x - 3)(x^2 - 6x + 8)$

| | | | |
|------|---------|----------|-------|
| | x^2 | $-6x$ | 8 |
| $2x$ | $2x^3$ | $-12x^2$ | $16x$ |
| -3 | $-3x^2$ | $18x$ | -24 |

$$\underline{2x^3 - 15x^2 + 34x - 24}$$

18. $(5x + 6)^2$

$$(5x + 6)(5x + 6)$$

$$\begin{array}{r} 5x + 6 \\ 5x + 6 \\ \hline 30x + 36 \\ 25x^2 + 30x + 0 \\ \hline 25x^2 + 60x + 36 \end{array}$$

20. $(7x - 5)^3$

$$(7x - 5)(7x - 5)(7x - 5)$$

$$(49x^2 - 35x - 35x + 25)(7x - 5)$$

$$(49x^2 - 70x + 25)(7x - 5)$$

$$\begin{array}{r} 49x^2 - 70x + 25 \\ 7x - 5 \\ \hline -245x^2 + 350x - 125 \\ 343x^3 - 149x^2 + 175x + 0 \\ \hline 343x^3 - 344x^2 + 525x - 125 \end{array}$$

22. $(4x - 5)(12x^2 - 6x + 13)$

| | | | |
|------|----------|----------|-------|
| | $12x^2$ | $-6x$ | 13 |
| $4x$ | $48x^3$ | $-24x^2$ | $52x$ |
| -5 | $-60x^2$ | $30x$ | -65 |

$$\underline{48x^3 - 84x^2 + 82x - 65}$$

13. $(2xyz)(-4x^2yz^3)$

$$\underline{-8x^3y^2z^4}$$

15. $(x - 5)(x^2 - 4)$

$$x(x^2) + x(-4) + -5(x^2) + -5(-4)$$

$$x^3 - 4x - 5x^2 + 20$$

$$\underline{x^3 - 5x^2 - 4x + 20}$$

17. $(z - 3)(z + 3)$

$$z(z) + z(3) + -3(z) + -3(3)$$

$$z^2 + 3z - 3z - 9$$

$$\underline{z^2 - 9}$$

19. $(10 + x)(10 - x)$

$$10(10) + 10(-x) + x(10) + x(-x)$$

$$100 + -10x + 10x - x^2$$

$$\underline{-x^2 + 100}$$

21. $(3y + 4x)(13x^2 - 2x + 4)$

$$(3y + 4x)(13x^2) + (3y + 4x)(-2x) + (3y + 4x)(4)$$

$$3y(13x^2) + 4x(13x^2) + 3y(-2x) + 4x(-2x) + 3y(4) + 4x(4)$$

$$39x^2y + 52x^3 - 6xy - 8x^2 + 12y + 16x$$

$$\underline{52x^3 + 39x^2y - 8x^2 - 6xy + 16x + 12y}$$

23. $(4xy + 3x - 7y)(2x^2 + 4y - 2)$

| | | | |
|-------|-----------|----------|--------|
| | $2x^2$ | $4y$ | -2 |
| $4xy$ | $8x^3y$ | $16xy^2$ | $-8xy$ |
| $3x$ | $6x^3$ | $12xy$ | $-6x$ |
| $-7y$ | $-14x^2y$ | $-28y^2$ | $14y$ |

$$\underline{8x^3y + 6x^3 - 14x^2y + 16xy^2 - 28y^2 + 4xy - 6x + 14y}$$

