

POLYNOMIALS

- Definition: an expression consisting of many terms.
- Standard Form: written in alpha order with highest exponents first.
- Example: $2x^{\textcircled{3}} + 5x^2 - 4x + 7$ * The highest exponent is called the degree.

- Classifying Polynomials: All polynomials are classified by degree and number of terms.

DEGREE	
0	Constant
1	Linear
2	Quadratic
3	Cubic
4	Quartic

NUMBER OF TERMS	
1	Monomial
2	Binomial
3	Trinomial
4 or more	Polynomial

Classify the following polynomials by degree and number of terms.

1. 6 1. Constant monomial
2. $-2x$ 2. _____
3. $7x + 1$ 3. linear binomial
4. $x^2 + 2x - 5$ 4. _____
5. $4x^3 - 8$ 5. cubic binomial
6. $2x^4 - 7x^2 - 5x + 1$ 6. quartic polynomial

Write the following polynomials in standard form.

7. $3x + 1 + 2x^2$ 7. $2x^2 + 3x + 1$
8. $x^2 + 64 - x + 7x^3$ 8. _____
9. $x^3 + 5x^2 + 28 - x$ 9. $x^3 + 5x^2 - x + 28$
10. $24 - x^3 + x$ 10. _____
11. $2ab + a^3 + 5a^2b^2 - 2b^3$ 11. $a^3 + 5a^2b^2 + 2ab - 2b^3$
12. $13 - x^3 + 5y^3 - 7x^2y^2$ 12. $-x^3 - 7x^2y^2 + 5y^3 + 13$

Adding/Subtracting Polynomials

Example 1: $(18x - 2x^2 + 15) + (3x^2 - 10 - 8x)$

$$1x^2 + 10x + 5$$

Example 2: $(6x^2 + 7x) - (10x + 3x^2 + 2)$

$$3x^2 - 3x - 2$$

Directions: Solve the following problems. Match that answer to the correct letter of the alphabet. Enter that letter of the alphabet on the blank corresponding to the problem number.

DD
ND
U
ON

- | | | | | | | | | |
|------------|-------------------|-----------|------------------|--------------------------|--------------------|-----------|-------------|------------------|
| A | B | C | D | E | F | G | H | I |
| $5x - 2y$ | $4x + 11$ | -4 | $-5x^2 - 3x + 2$ | 0 | $3x^2 + 11$ | 4 | $3x^2 - 16$ | $-3x - 8$ |
| J | K | L | M | N | O | P | | |
| $9x - 10y$ | $2x^2 + 12x + 10$ | $x^2 + 2$ | $5x - 5y$ | $3x^3 + 10x^2 - 42x + 8$ | $2x + 4y$ | $2x - 4y$ | | |
| Q | R | S | T | U | V | W | X | Y |
| -12 | $2x^2 + 5x - 8$ | $2x^2$ | 12 | $5x^2 + 10x + 6$ | $13x^2 + 16x - 10$ | $x^2 - 2$ | 1 | $x^3 + 5x^2 + 2$ |

SIMPLIFY:

- | | |
|---|--|
| <p>U \odot $(2x^2 + 4x + 1) + (3x^2 + 6x + 5)$
$5x^2 + 10x + 6$</p> <p>2. $(x + 6) + (3x + 5)$</p> <p>3. $(x^2 + 2x^2 - 4) + (3x^2 + 6)$</p> <p>0 \odot $(4x - 2y) - (2x - 6y)$
$2x + 4y$</p> <p>5. $(x^2 + 6x - 4) - (x^2 + 6x - 4)$</p> <p>6. $6x - 4 - 6x$</p> <p>7. $3x + 6y - 8y + 2x$</p> <p>8. Find the difference of $(6x^2 + 3x - 5)$ and $(4x^2 - 2x + 3)$</p> | <p>9. $(x^2 + 6) - (6 - x^2)$</p> <p>10. $(3x - 6y) + (2x + y)$</p> <p>11. $(5x - 6) - (8x + 2)$</p> <p>D \odot $(3x^2 + x - 4) - (4x - 6 + 8x^2)$
$-5x^2 - 3x + 2$</p> <p>13. $(x^2 + 6x + 5) + (x^2 + 6x + 5)$</p> <p>N \odot $(3x^3 + 6x^2 - 18x) + (4x^2 - 24x + 8)$
$3x^3 + 10x^2 - 42x + 8$</p> <p>15. $(3x + 6) - (3x - 6)$</p> <p>16. Subtract $(6x^2 + 8x - 6)$ from $(7x^2 + 8x - 4)$</p> |
|---|--|

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Monomial x Polynomial

Recall the Product Rule: $x^a \cdot x^b = x^{a+b}$

Directions: Find each product. Final answers must be in standard form.		
1. $h(h + 4)$ $h^2 + 4h$	2. $k(k - 9)$	3. $9a(a + 1)$
4. $6p(p - 8)$	5. $3c(-2c - 5)$	6. $-4g^2(2g + 7)$
7. $x(x^2 - x + 3)$ $x^3 - x^2 + 3x$	8. $5m^2(3m^2 - m - 7)$	9. $-3n(n^2 - 2n + 8)$
10. $-2x(6x^2 - 12x + 18)$	11. $3xy(x^2 + xy + y^2)$	12. $5r^2s^2(-2r^2 + 3rs - 4s^2)$
13. $3ab(4a^3 - 7b^4)$ $12a^3b - 21ab^4$	14. $-4c^2d^4(9c^2d^2 - 4cd^5)$ $-36c^4d^6 + 16c^2d^9$	15. $10m^4n(-2mn^3 + 3n)$

Directions: Distribute, then simplify the remaining expression. Final answer must be in standard form.	
16. $-2x(3x - 4) + 7x$	17. $5w(-7w + 2) + 2w(-2w^2 + 19w + 2)$
18. $y(y + 4) - y(y - 3) - 9y$	19. $6x(2x - 3) - 5(2x^2 + 9x - 3)$
20. $-2(3m^3 + 5m + 6) + 3m(2m^2 + 3m + 1)$	21. $-3y(7y - 2) + 3(y^2 + 2y + 1) - 3y(-5y + 3)$

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$$5. (x + 1)(x^2 + 2x + 1)$$

$$7. (3x + 1)(5x^2 + 2x - 6)$$

$$15x^3 + 6x^2 - 18x + 5x^2 + 2x - 6$$

$$15x^3 + 11x^2 - 16x - 6$$