

8.1 Part 1 Polynomials

A monomial is a number, a variable, or the product of a number and one or more variables with whole number exponents.

Some examples...

$$15$$

$$x$$

$$15x$$

$$x^2y^4$$



The degree of a monomial is the ^{add} sum of the exponents of the variables.

EXAMPLES: State the degree of each monomial.

1. $-5x^4y^2$
 $4 + 2 = 6$

2. $\frac{2}{3}b^3$
 3

3. 12
 0

4. $7g^2h$
 $2 + 1 = 3$

5. -10
 0

6. $-9p$
 1



A polynomial is a monomial or a sum of monomials.

binomial- has 2 terms

trinomial- has 3 terms

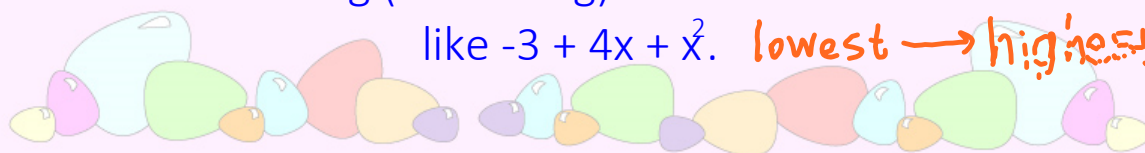
Polynomials are usually written in standard form, which means that the terms are arranged in decreasing order of the exponents.

highest exp \rightarrow lowest exp

For example, $x^2 + 4x - 3$ is in decreasing (descending) order.

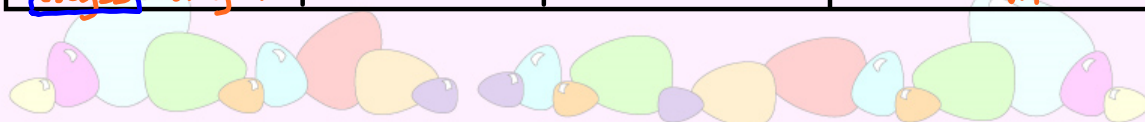
Increasing (ascending) order would look

like $-3 + 4x + x^2$. lowest \rightarrow highest



Identify the polynomial by degree and by the number of terms.

Polynomial	Degree	Identified by Degree	Identified by # of terms
6	no var. 0	constant	monomial (1 term)
$3x^1 + 1$ deg=1 deg=0	1	linear	binomial (2 terms)
$-x^2 + 2x^1 - 5$ deg=2 deg=1 deg=0	2	quadratic	trinomial (3 terms)
$4x^3 - 8x^1$ deg=3 deg=1	3	cubic	binomial (2 terms)



EXAMPLES: Arrange the terms of each polynomial so that the powers of x are in descending order.
highest \rightarrow lowest

$$1. \quad 20x^1 - 5x^3 - 7x^2 + 4x^4$$

$$4x^4 - 5x^3 - 7x^2 + 20x$$

$$2. \quad 24x^2y - 12x^3y^2 + 6x^4 - 9y^5x^0$$

$$6x^4 - 12x^3y^2 + 24x^2y - 9y^5$$



EXAMPLES: Arrange the terms of each polynomial so that the powers of x are in ascending order.
lowest \rightarrow highest

$$1. \quad -12x^2 + 11x^5 - 18x^1 - 6x^3 + 15 \leftarrow (0)$$

$$15 - 18x - 12x^2 - 6x^3 + 11x^5$$

$$2. \quad -8xy^4 + 9x^4y - 5x^3y^2 + x^5 - 6x^2y^6$$

$$-8xy^4 - 6x^2y^6 - 5x^3y^2 + 9x^4y + x^5$$



8.1 Part 2 Adding and Subtracting Polynomials

Remember, you can only add and subtract like terms.

don't change { same variable
same exponent

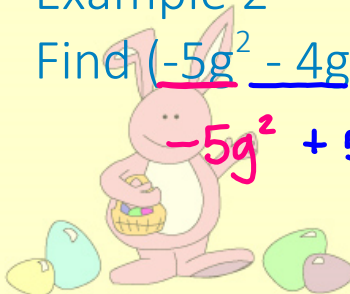
Example 1

Find $(3y^2 + 5y - 6) + (7y^2 - 9)$.

$$10y^2 + 5y - 15$$

Example 2

Find $(-5g^2 - 4g - 2) + (9g - 10)$.



$$-5g^2 + 5g - 12$$

Example 3

$$\begin{array}{r} 8k^2 + 6k - 11 \\ (+) -2k^2 \quad - 13 \\ \hline 6k^2 + 6k - 24 \end{array}$$

Example 4

$$\begin{array}{r} -5w^2 - 7w + 12 \\ (+) -w^2 + 16w - 8 \\ \hline -6w^2 + 9w + 4 \end{array}$$



Recall that you can subtract by adding the opposite.

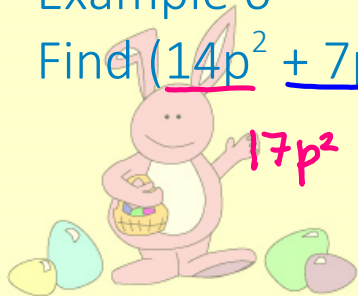
Example 5

Find $(-7m^2 - 5m + 1) - (-3m^2 + 4m - 9)$.

$$-4m^2 - m - 8$$

Example 6

Find $(14p^2 + 7p - 11) - (-3p^2 + 8p - 5)$.



$$17p^2 + 15p - 16$$

Example 7

$$\begin{array}{r} 3d^2 + 7d + 8 \\ (+) -2d^2 + 4d - 3 \\ \hline d^2 + 11d + 5 \end{array}$$

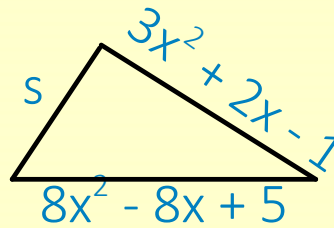
Example 8

$$\begin{array}{r} 7p^2q^2 - 8pq + 9 \\ (+) -p^2q^2 + 9pq + 10 \\ \hline 6p^2q^2 + pq + 19 \end{array}$$



Example 9

Find the measure of the third side of the triangle below. P is the measure of the perimeter. distance around a shape



$$P = 3x^2 + 2x - 1$$

side 1 + side 2 + side 3 = perimeter

$$(3x^2 + 2x - 1) + (8x^2 - 8x + 5) + s = 3x^2 + 2x - 1$$

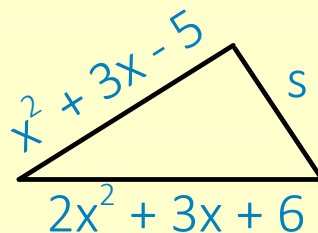
$$\begin{array}{r} 11x^2 - 6x + 4 \\ -3x^2 - 6x - 4 \\ \hline 8x^2 - 12x \end{array} + s = 3x^2 + 2x - 1$$

$$s = -8x^2 + 8x - 5$$



Example 10

Find the measure of the third side of the triangle below. P is the measure of the perimeter.



$$P = 4x^2 + 5x + 5$$

side 1 + side 2 + side 3 = perimeter

$$(2x^2 + 3x + 6) + (x^2 + 3x - 5) + s = 4x^2 + 5x + 5$$

$$\begin{array}{r} 3x^2 + 6x + 1 \\ -3x^2 - 6x - 1 \\ \hline 0x^2 + 0x + 0 \end{array} + s = 4x^2 + 5x + 5$$

$$s = x^2 - x + 4$$

