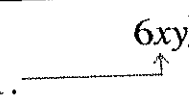
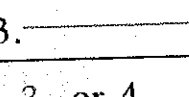


Working with Polynomials

4-1 Polynomials

Objective To simplify, add, and subtract polynomials.

Here is a review of some terms you'll use when working with polynomials.

Definition	Examples
Constant: a number	$-2, \frac{3}{5}, 0$
Monomial: a constant, a variable, or a product of a constant and one or more variables	$-7, u, \frac{1}{3}m^2, -s^2t^3, 6xy^3$
Coefficient (or numerical coefficient): the constant (or numerical) factor in a monomial	The coefficient of $3m^2$ is 3. The coefficient of u is 1. The coefficient of $-s^2t^3$ is -1 .
Degree of a variable in a monomial: the number of times the variable occurs as a factor in the monomial	The degree of x is 1.  The degree of y is 3. 
Degree of a monomial: the sum of the degrees of the variables in the monomial. A nonzero constant has degree 0. The constant 0 has <i>no degree</i> .	$6xy^3$ has degree $1 + 3$, or 4. $-s^2t^3$ has degree $2 + 3$, or 5. u has degree 1. -7 has degree 0.
Similar (or like) monomials: monomials that are identical or that differ only in their coefficients	$-s^2t^3$ and $2s^2t^3$ are similar. $6xy^3$ and $6x^3y$ are <i>not</i> similar.
Polynomial: a monomial or a sum of monomials. The monomials in a polynomial are called the terms of the polynomial.	$x^2 + (-4)x + 5$, or $x^2 - 4x + 5$ The terms are x^2 , $-4x$, and 5.
Simplified polynomial: a polynomial in which no two terms are similar. The terms are usually arranged in order of decreasing degree of one of the variables.	$2x^3 - 5 + 4x + x^3$ is <i>not</i> simplified, but $3x^3 + 4x - 5$ is simplified.

I can Add and Subtract Polynomials

EASY ⁰⁰ _y: To Add two or more polynomials, write their sum and then simplify by combining similar terms

Example $(2x^2 - 3x + 5) + (x^3 - 5x^2 + 2x - 5)$

Since there is nothing to distribute I can drop both sets of parenthesis and just combine like terms. That's it

$$\cancel{2x^2} - \cancel{3x} + 5 + \cancel{x^3} - \cancel{5x^2} + \cancel{2x} - 5 = -3x^2 - 1x + x^3 + 0$$

Then make sure to write your answer in decreasing order in terms of x . So final answer is

$$\boxed{x^3 - 3x^2 - 1x + 0}$$

#2 $(2x^3 - 7) + (5x^2 - x^3 + 3x - x^3)$

$$\cancel{2x^3} - 7 + \cancel{5x^2} - \cancel{x^3} + 3x - \cancel{x^3} = 2x^3 - x^3 + 5x^2 + 3x - 7 =$$

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

I can subtract Polynomials.

*Key Point

make sure to distribute the "subtraction" sign that is in front of the parenthesis

Example: $(2x^2 - 3x + 5) - (x^3 - 5x^2 + 2x - 5)$

~~$2x^2 - 3x + 5 - x^3 + 5x^2 - 2x + 5$~~

now I just combine like terms like the addition examples

I distributed the negative sign

$-x^3 + 7x^2 - 5x + 10$

You got it!!

#2 $2x^2 - 3x + 5 - (x^3 - 5x^2 + 2x - 5)$

~~$2x^2 - 3x + 5 - x^3 + 5x^2 - 2x + 5$~~

Distribute the negative

$7x^2 - 5x - x^3 + 10$

$-x^3 + 7x^2 - 5x + 10$

#3 $(4x^3 + 5x^2 - 6x) - (3x^3 + 2x^2 - 6x + 10)$

~~$4x^3 + 5x^2 - 6x - 3x^3 - 2x^2 + 6x - 10$~~

Distribute the negative sign

$1x^3 + 3x^2 + 0x - 10$

* I can use the finite differences method to analyze a table

All you have to do is subtract until you find a constant amount

That's it ^{oo} I know everybody can subtract _o

Example of procedure

X	Y	1 st	2 nd differences
0	6		
1	8	2	
2	8	0	-2
3	6	-2	-2
4	2	-4	-2
5	-4	-6	-2

look the differences are all constant!
It took me 2 times to get this result.

we did $8-6=2$
 $8-8=0$ $0-2=-2$
 $6-8=-2$ $2-0=2$
 $2-6=-4$ $-4-2=-2$
 $-4-2=-6$ $-6-4=-2$

∴ Since it took 2 times, the pattern is Quadratic

Example #2

X	Y	1 st	2 nd	3 rd
0	10			
1	9	-1		
2	30	+21	22	
3	91	61	40	18
4	210	119	58	18
5	405	195	76	18

"oh look" on the 3rd try all the differences are the same. This means it is a (Cubic)

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Advanced Algebra

Unit 5 Finite Difference Tables

Learning Target #3: I can determine if a relationship is quadratic, linear or cubic, by examining tables, and rates of change.

Method: use the finite differences method to tell if a table is a linear pattern, quadratic pattern, or cubic pattern.

Use the finite differences method to analyze the tables to see if they are linear, quadratic, cubic.

1)

X values	Y vales
5	32
6	38
7	44
8	50
9	56
10	62
11	68

2)

X values	Y values
5	382
6	657
7	1040
8	1549
9	2202
10	3017
11	4012

3)

X values	Y values
5	69
6	96
7	127
8	162
9	201
10	244
11	291

4)

X values	Y values
5	50.5
6	62
7	74.5
8	88
9	102.5
10	118
11	134.5

5)

X values	Y values
5	245
6	424
7	675
8	1010
9	1441
10	1980
11	2639

I can Multiply Polynomials

Key Point! Use the Box!

Example #1: I can distribute

$$3(x^2 - 2x + 4) + 2(5x^2 - 7)$$

$$3x^2 - 6x + 12 + 10x^2 - 14$$

$$\boxed{13x^2 - 6x - 2}$$

Distribute the number
in front of the parenthesis

combine like terms

I can multiply Polynomials - Use the Box

$$(2x^2 + 3x - 6)(5x^3 - 2x^2 + 2x)$$

$5x^3$	$2x^2$	$+ 3x$	$- 6$
$-2x^2$	$-4x^4$	$-6x^3$	$12x^2$
$2x$	$4x^3$	$6x^2$	$-12x$

now combine like terms

$$\boxed{10x^5 + 11x^4 - 32x^3 + 18x^2 - 12x}$$

Next example #3

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Advanced Algebra

Unit 5: Polynomials: Assignment #3a

First use the distributive property and then combine like terms

1) $2(x^3 + 3x^2 - 6x + 2) + 4(x^2 - 8x)$

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

3) $\frac{1}{4}(x^5 - 3x^4 + 2x - 6) - (3x^4 + 8x - 12)$

Transform the following into General Form (Use your box skills)

1) $y = 4(x-2)(x+8)(x+9)$

2) $y = -3(x+5)(x+8)(x-7)$

3) $y = 6(x-5)(x-2)(x+6)$

4) $y = -.9(x+6)(x-8)(x+1)$

5) $y = \frac{1}{4}(4x+8)(2x-3)(x+5)$