Algebra II
Section 3-2

OPERATIONS WITH POLYNOMIALS

Time to add another line to the chart. Think about what the problem 6x + 4x equals before you try to fill in the last two columns.

Operation	Coefficients	Exponent
Multiply	mult	add
Raise to a power	sq., cube, etc	mult
Divide	div. or reduce	subt
Add or subtract	add or subtract	do nothing

Examples: 1) $(2x^2 - 4x + 9) + (x^2 + 6x - 13)$

$3x^2 + 2x - 4$

2) $(-8m - 3mn) + (m + 5n - 7mn)$

$-7m - 10mn + 5n$

3) $(8x^3 - 7x) - (6x^3 - 5x)$

Distribute a (-1)
$8x^3 - 7x - 6x^3 + 5x$
$2x^3 - 2x$

4) $(5r^2 - 10xy + 12) - (17 - 2xy + 3r^2)$

$5r^2 - 10xy + 12 - 17 + 2xy - 3r^2$
$2r^2 - 8xy - 5$

POLYNOMIALS AND THEIR DEGREE

Here are some expressions, some of which are considered polynomials, and some are not. Take an educated guess!

		YES/NO?	DEGREE
1)	$7x^2 - x + 6x^{-5}$	no	
2)	$5a^6 + 2a - 3 + 5a^8$	yes	8
3)	$9y + \sqrt{y} - 4$	no	
4)	$9y + y^2\sqrt{5}$	yes	2
5)	$12w^3v^2 + 8wv^4 - 1 - 10w^3v^3$	yes	6
6)	$\frac{1}{x} + \frac{3}{y} + 7y$	no	

inside "root"

highest exponent (single variable)

highest total of exponents per term (multiply variables)

Some expressions are considered polynomials and some are not. Polynomials, for all intent and purposes are a bunch of math where the variable(s) have no exponent less than ONE!

The degree of a polynomial with ONE variable = the highest exponent.

With more than one variable, it is the highest total of the exponents from each monomial.

THE DISTRIBUTIVE PROPERTY (USING EXPONENTS)

Examples:

1) $3n^3p(5np^4 + 11n^2p^2)$

$15n^4p^5 + 33n^5p^3$

2) $9x^3(2x - 3x^{-3} - x^{-2}y)$

$18x^4 - 27 - 9xy$

3) $a^{-1}b^2(ab^{-1} + 8a^5b^{-2} + a^{-3})$

$b + 8a^4 + a^{-4}b^2$

$$b + 8a^4 + \frac{b^2}{a^4}$$

move the a^4 to the bottom of only the 3rd term (do not make one big fraction)

Both:

Homework: pg322-323 15-28, 42-47

THE FOIL METHOD (**F** irst, **O** utside, **I** nside, **L** ast)

Examples:

4) $(x + 9)(x - 7)$

F: $x \bullet x = x^2$
O: $x \bullet -7 = -7x$
I: $9 \bullet x = 9x$
L: $9 \bullet -7 = -63$
combine: $x^2 + 2x - 63$

5) $(5y - 2)(4y - 11)$

F: $5y \bullet 4y = 20y^2$
O: $5y \bullet -11 = -55y$
I: $-2 \bullet 4y = -8y$
L: $-2 \bullet -11 = 22$
combine: $20y^2 - 63y + 22$

6) $(7a - 4b)(7a + 4b)$

$49a^2 + 28ab - 28ab - 16b^2$
$49a^2 - 16b^2$
The "O" & "I" cancelled.
You may skip doing them for this type of problem.

7) $(x^2 - 8)(x^2 + 6x)$

$x^4 + 6x^3 - 8x^2 - 48x$
Sometimes, after doing FOIL, nothing will combine

8) $(2n + 9)^2$

$(2n + 9)^2 = (2n + 9)(2n + 9)$
$= 4n^2 + 18n + 18n + 81$
$= 4n^2 + 36n + 81$

THE BOX METHOD

Try to remember way back to elementary school! Do you remember filling in any multiplication tables? Maybe that will help you decide how to do these problems.

Examples:

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

	x^2	$5x$	-8
$3x$	$3x^3$	$15x^2$	$-24x$
-2	$-2x^2$	$-10x$	16

combine what's in the box
$= 3x^3 + 13x^2 - 34x + 16$

2) $(y^2 + 4y - 1)(2y^2 - 6y + 7)$

	$2y^2$	$-6y$	7
y^2	$2y^4$	$-6y^3$	$7y^2$
$4y$	$8y^3$	$-24y^2$	$28y$
-1	$-2y^2$	$6y$	-7

$= 2y^4 + 2y^3 - 19y^2 + 34y - 7$