Warmup:

What are the names of the different types of polynomials:

By degree:

$4x$ or $-6x$
linear

$4x^2$ or $-6x^2$
quadratic

4 or -6
constant

By number of terms:

monomial
1 term

binomial
2 terms

trinomial
3 terms

Simplify each expression.

1) $(9a^5 + 2a^4 + 3a) - (-10a^5 - 10a^2 + 7a^4)$

2) $(6x - 2 - 13x^5) + (-5x^2 - 7x^5 + 4)$

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$9a^5 + 2a^4 + 3a + 10a^5 + 10a^2 - 7a^4$

$19a^5 - 5a^4 + 10a^2 + 3a$

$-20x^5 - 5x^2 + 6x + 2$

HW #3 Answer Key

1) $-k$

Linear Monomial

2) $5v - 9$

Linear Binomial

3) $-1 - 8r - 7r^2$

Quadratic Trinomial

4) -10

Constant Monomial

5) $-6 + 8n^2 + 4n$

Quadratic Trinomial

6) $10x^2 - x$

Quadratic Binomial

7) $n^3 - 3n + 2n + n^3$

$2n^3 - n$

8) $2a^2 + 5 + 4 + 4a^2$

$6a^2 + 9$

9) $8p^2 - 3p^3 + 3p^3 + 5p^2$

$13p^2$

10) $(7p + 2 - 2p^2) + (5p^2 - p)$

$3p^2 + 6p + 2$

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

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

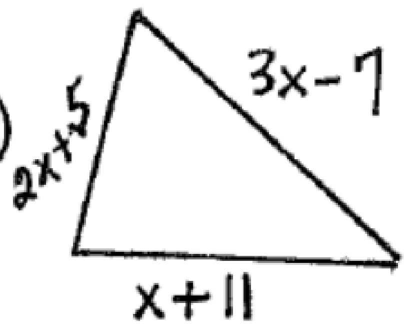
12) $(-8 + 5x) + (4x - 8x^4)$

$-8x^4 + 9x - 8$

3) $(8r - 4r^2) + (6r^2 + 2r)$

$2r^2 + 10r$

14)



$P = 6x + 9$

E.Q.

How do we multiply polynomials together?

Perform arithmetic operations on polynomials

MGSE9–12.A.APR.1 Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations. *(For the purpose of this course, operations with polynomials will be limited to the second degree. Higher degree polynomials will be addressed in future courses.)*

When multiplying a monomial by a polynomial, just use distribution!

1. $5(7n - 2)$

2. $-4m^3(-3m - 6n + 4p)$

$5 \cdot (7n - 2)$

$35n - 10$

$-4m^3(-3m - 6n + 4p)$

$12m^4 + 24m^3n - 16m^3p$

$-4 \cdot m \cdot m \cdot m \cdot -3 \cdot m$

$12 \cdot m \cdot m \cdot m \cdot m$

$12m^4$

3. $\frac{3}{4}a\,(8a + 12)$

$\frac{3}{4}a\,(8a + 12)$

$\frac{3}{4}a \cdot \frac{8a}{1} + \frac{3}{4}a \cdot \frac{12}{1}$

$\frac{24}{4}a^2 + \frac{36}{4}a$

$6a^2 + 9a$

There are two techniques you can use for multiplying binomials. The best part about it is that they are all the same!

It's all about how you write it ...

1. FOIL (distributive property)
2. Box Method (Area method)

BOX METHOD:

To use the box method you are basically finding the area of 4 boxes and then combining like terms. **Remember Area = Length * Width**

1. (x+4)(x-3)

	x	+4
x	$\boxed{x^2}$	$+4x$
-3	$-3x$	-12

$= x^2 \underbrace{+4x-3x}\ -12$

$= x^2 + x - 12$

2. (2x-4)(2x-4)

	2x	-4
2x	$\boxed{4x^2}$	$-8x$
-4	$-8x$	$+16$

$4x^2 - 16x + 16$

3. $(3x+3)(x+2)$

	$3x$	$+3$
x	$3x^2$	$3x$
$+2$	$6x$	6

$= 3x^2 + 9x + 6$

4. $(x+3)(x+3)$

	x	$+3$
x	x^2	$+3x$
$+3$	$+3x$	$+9$

$x^2 + 6x + 9$

Example 1: Use the FOIL method to multiply the following binomials: $(y+3)(y+7)$

F tells you to multiply the First terms of each binomial.

$y \cdot y = y^2$

O tells you to multiply the outer terms of each binomial.

$y \cdot 7 = 7y$

I tells you to multiply the inner terms of each binomial.

$3 \cdot y = 3y$

L tells you to multiply the Last terms of each binomial.

$3 \cdot 7 = 21$

Answer:

$y^2 + 7y + 3y + 21 = y^2 + 10y + 21$

Example:

1. $(x + 3)(x - 2)$

F x^2

O $-2x$

I $3x$

L -6

$x^2 + x - 6$

2. $(x - 5)(x - 2)$

F x^2

O $-2x$

I $-5x$

L $+10$

$x^2 - 7x + 10$

3. $(x + 1)(x + 8)$

F x^2

O $8x$

I x

L 8

$x^2 + 9x + 8$

You try!

Multiply (y+4)(y-3) using FOIL

F O I L

y^2 $-3y$ $+4y$ -12

$y^2 + y - 12$

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

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

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

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

$(x^2-2x-15)(x-6)$

	x^2	$-2x$	-15
x	x^3	$-2x^2$	$-15x$
-6	$-6x^2$	$+12x$	$+90$

$x^3-8x^2-3x+90$

F x^2

O $-5x$

I $+3x$

L -15

$x^2-2x-15$

HW #4

Multiplying Polynomials