Function Operations
L8
Warm-up

Rewrite each polynomial from highest to lowest exponent. Then identify the leading coefficient, degree, and number of terms.

1. $3 - 5x^2 + 4x$
2. $3x^2 - 4 + 8x^4 - 16x$

Adding/Subtracting Functions

- Think of it as just combining "like terms"
- You can only combine terms that have the same degree.

Adding and subtracting Functions
Given f(x)= $(3x^2 - 5x^3 + x)$ and g(x)= $(3x - 5x^2 + x^3)$
Solve for f(x)+g(x)

Rearrange polynomials so the degrees line up.	$f(x) = (-5x^3 + 3x^2 + x)$ $g(x) = \quad (x^3 - 5x^2 + 3x)$
Add or subtract.	$(-5x^3 + 3x^2 + x)$ $+(x^3 - 5x^2 + 3x)$ $-4x^3 - 2x^2 + 4x$

Don't forget to distribute the negative when subtracting.
f(x)= $(5a^3 - 4a^5 + 3a)$
g(x)= $(2a^3 - a^4 + a)$
Solve for f(x) - g(x)

$f(x) - g(x) = (5a^3 - 4a^5 + 3a) - (2a^3 - a^4 + a)$

Rearrange polynomials so the degrees line up.	
Add or subtract.	

We try:
Given:
$f(x) = 5x^3 + 12 + 6x^2$
$g(x) = 15x^2 + 3x - 2$

Solve for
1) $f(x) + g(x)$
2) $f(x) - g(x)$
3) $g(x) - f(x)$

You Try with your partners:
$Given: f(x) = (2a^3 - a^2 + a - 3)$
$g(x) = (a^3 - 2a + 4)$
Solve for

1) $f(x) + f(x)$
2) $g(x) + f(x)$

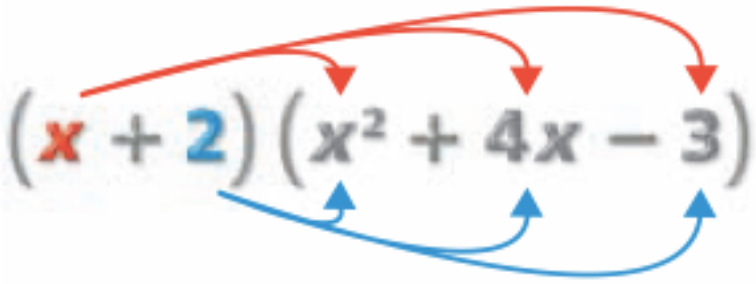
NOTE

$$f(x) + g(x) \text{ can also be written as } (f+g)(x)$$
$$f(x) - g(x) = (f-g)(x)$$

Multiplying Functions

Given $f(x) = (x+2) and\ g(x) = (x^2 + 4x - 3)$

Solve for $f(x) \cdot g(x)$



$$x(x^2 + 4x - 3) + 2(x^2 + 4x - 3) =$$
$$x^3 + 4x^2 - 3x \ + \ 2x^2 + 8x - 6 =$$
$$x^3 + 4x^2 + 2x^2 - 3x + 8x - 6 =$$
$$x^3 + 6x^2 + 5x - 6$$

Don't forget to distribute the negative.

Given:

$f(x) = (2x - 3)$

$g(x) = (x^2 + x - 5)$

Solve for $f(x) \cdot g(x)$

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

Solve for $f(x) \cdot f(x) =$

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

Division
Just write it as a fraction and state undefined values!
$f(x) = x^2 + 3$
$g(x) = x + 5$

solve for $f(x) \div g(x)$

$$\frac{f(x)}{g(x)} = \frac{x^2 + 3}{x + 5} \; x \neq -5$$

We Try:

Given
$f(x) = x^2 + 10x + 5$
$g(x) = x - 15$

solve for $f(x) \div g(x)$

Given
$f(x) = x - 12$
$g(x) = x + 3$

Solve for

$g(x) \div f(x)$

Closure:
Is it possible to end up with a larger degree than we started with when adding or subtracting polynomials? Is it possible to end up with a smaller degree?