

# Teacher Notes

## 1.1.4 What is the new function?

Combining Linear Functions



Vocabulary	
Constant	A # on its own without any variables
Leading Coefficient	The coefficient of the term with the highest degree
Standard Form	When all like terms have been combined and the terms are written in descending order by exponent.
Degree	The highest exponent of its terms

Naming Polynomials																				
		By Degree:																		
		<table border="1"> <thead> <tr> <th>Degree</th> <th>Name</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>constant</td> <td>2</td> </tr> <tr> <td>1</td> <td>Linear</td> <td><math>4x + 1</math></td> </tr> <tr> <td>2</td> <td>Quadratic</td> <td><math>4x^2 - 5x - 9</math></td> </tr> <tr> <td>3</td> <td>cubic</td> <td><math>x^3 + 2x^2 - 3x - 1</math></td> </tr> <tr> <td>4</td> <td>Quartic</td> <td><math>x^4 - 3x^2 + x - 11</math></td> </tr> </tbody> </table>	Degree	Name	Example	0	constant	2	1	Linear	$4x + 1$	2	Quadratic	$4x^2 - 5x - 9$	3	cubic	$x^3 + 2x^2 - 3x - 1$	4	Quartic	$x^4 - 3x^2 + x - 11$
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Example 1) Given the expression:  $3x^4 - 5x^3 + x^2 + 6x - 1$ , answer the following questions.

What is the coefficient of the third degree term?  $-5$

What is the leading coefficient?

$3$

What is the coefficient of the second degree term?  $1$

Name the expression by degree.

degree = 4 = quartic

How many terms are in the expression?  $5$

### Examples of Non-Polynomials

$$y = \sqrt{x}$$

$$y = 3^x$$

$$y = \frac{1}{x}$$

### Practicing Operations with Polynomials

Example 2) Find  $(\underline{4x} - \underline{2x^3} + \underline{7}) - (\underline{9x^2} - \underline{6x} - \underline{7})$

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

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

$$\underline{5x^2} + \underline{2x} - \underline{3x^2} + \underline{4x} - \underline{6}$$

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

Example 4)  $(4x^3 + 6x + 1)(-5x^2 - 3x - 6)$

	$4x^3$	$6x$	$1$
$-5x^2$	$-20x^5$	$-30x^3$	$-5x^2$
$-3x$	$-12x^4$	$-18x^2$	$-3x$
$-6$	$-24x^3$	$+36x$	$-6$

$$\boxed{-20x^5 - 12x^4 - 54x^3 - 23x^2 - 39x - 6}$$

Answer the questions below for the sum, difference, and product of your functions. Is the new function a polynomial function? If it is, what is its degree? If it is not, explain why not.

Given:  $f(x) = 2x^2 + 3x - 8$  and  $g(x) = 3x - 3$

A. Find  $f(x) + g(x)$

Polynomial?

Yes No

Degree:

B. Find  $f(x) - g(x)$

Polynomial?

Yes No

Degree:

C. Find  $g(x) \cdot f(x)$

Polynomial?

Yes No

Degree: