

Operations on Polynomial Functions Intro

Advanced Algebra

Name: Mr. B.
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Target 6B. Perform operations on polynomial functions.

Simplify by performing the indicated operation.

To do this, combine like terms. Remember when you combine like terms, add the numbers in front of the like terms. Ex: $3x^4 + 2x^4$ are like terms $5x - 3x^2$ are NOT.

Examples

A) Adding Polynomials

top Bottom
 $(7x^2 + 5x - 9) + (3x^2 - 6)$

$$\begin{array}{r} 7x^2 + 5x - 9 \\ 3x^2 \quad - 6 \\ \hline 10x^2 + 5x - 15 \end{array}$$

Line up like terms!

Final ans: $10x^2 + 5x - 15$

B) Subtracting Polynomials:

$(9a^2 + 6a + 16) - (8a^2 + 7a + 10)$

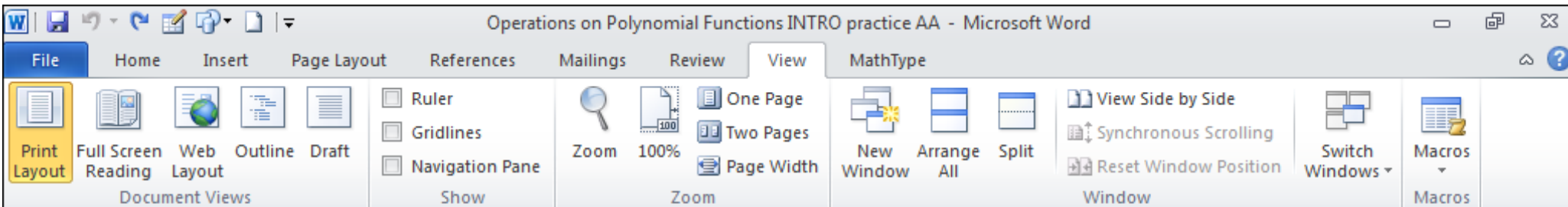
Distribute $\rightarrow -8a^2 - 7a - 10$
 minus first

Now line up!

$$\begin{array}{r} 9a^2 + 6a + 16 \\ -8a^2 - 7a - 10 \\ \hline 1a^2 - 1a + 6 \end{array}$$

Final ans: $a^2 - a + 6$

C) Multiplying Polynomials:



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$$(2x + 1)(5x^2 - x) \rightarrow 2 \text{ by } 2$$

Box Method:

① Multiply inside box ② Combine like terms

$5x^2$	$-x$	$2x \cdot 5x^2 = 10x^3$	} Like terms
$10x^3$	$-2x^2$	$2x \cdot (-x) = -2x^2$	
$5x^2$	$-x$	$5x^2 \cdot 1 = 5x^2$	
$+1$		$1 \cdot (-x) = -x$	

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

Final ans: $10x^3 + 3x^2 - x$

Now you try it!

Try the rest!

1. $(5p^2 - 3) + (2p^2 - 3p^3)$

2. $(a^3 - 2a^2) - (3a^2 - 4a^3)$

$$\begin{array}{r} 5p^2 - 3 \\ -3p^3 + 2p^2 \\ \hline -3p^3 + 7p^2 - 3 \end{array}$$

3. $(4 + 2n^3) + (5n^3 + 2)$

4. $(4n - 3n^3) - (3n^3 + 4n)$

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$$7. (12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$$

$$\begin{array}{r} 12a^5 \quad -10a^3 \quad -6a \\ -2a^5 - 14a^4 \quad -10a \\ \hline 10a^5 - 14a^4 - 10a^3 - 16a \end{array}$$

$$8. (8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$$

Try this side!

$$9. (-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$$

$$\begin{array}{r} 13x^5 - 1x^4 + 6x^3 \\ + 5x^5 + 7x^4 + 6x^3 \\ \hline 18x^5 + 6x^4 + 12x^3 \end{array}$$

$$10. (9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$$

$$11. -3x(4x^2 + 2x - 5) \text{ Multiply}$$

$$-3x \cdot 4x^2 - 3x \cdot 2x - 3x \cdot (-5)$$

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

$$12. (x^2 + 1)(x - 1)$$

$$13. (3m^3 + 1)(7m + 1)$$

$$14. (4y^2 + 1)(y^2 - y)$$

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13. $(3m^3 + 1)(7m + 1)$

	$3m^3$	$+1$	
$7m$	$21m^4$	$7m$	
$+1$	$3m^3$	1	

$$21m^4 + 3m^3 + 7m + 1$$

14. $(4y^2 + 1)(y^2 - y)$

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

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

$$x^3 + 2x^2 - x - 2$$

like terms

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