

**DECEMBER 11, 2015**

**UNIT 4: POLYNOMIALS**

**SECTION 5.3:  
ADDING  
POLYNOMIALS**

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***MATH 9***



## **WHAT'S THE POINT OF TODAY'S LESSON?**

**We will begin working on the Math 9 Specific Curriculum Outcome (SCO) "Patterns and Relations 6" OR PR6 which states:**

**PR6: "Model, record and explain the operations of addition and subtraction of polynomial expressions concretely, pictorially and symbolically (limited to polynomials of degree less than or equal to 2)."**



**What does THAT mean???**

**SCO PR6 means that we will learn how to add and subtract polynomials [numbers both with and without variables (letters)] first with pictures (algebra tiles) then without.**



**HOMEWORK QUESTIONS?**  
**(Pages 223 / 224, #14, 15, 19, 20 and 22)**

## **SIMPLIFYING POLYNOMIALS:**

**Terms containing the same variable(s) with the same exponent(s) can be grouped together by adding their numerical coefficients.**

$$\begin{aligned} \text{ex.:} \quad & \mathbf{x^2 + x^2 + x + x + x + 1 + 1 + 1 + 1 + 1} \\ & = \mathbf{2x^2 + 3x + 5} \end{aligned}$$

**ADDING** polynomials is very similar to grouping like terms:

Ex.:

$(x^2 + 3x + 4) + (2x^2 + 5x + 1)$

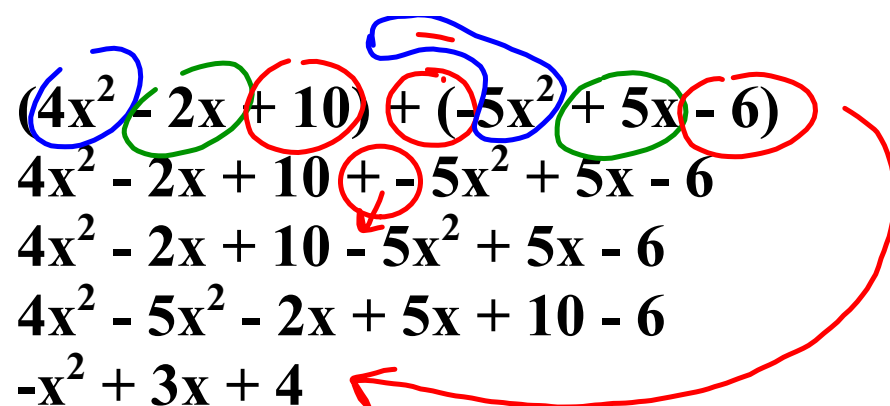
$= x^2 + 3x + 4 + 2x^2 + 5x + 1$

$= x^2 + 2x^2 + 3x + 5x + 4 + 1$

$= 3x^2 + 8x + 5$

The diagram includes a red arrow pointing down from the text above to the first polynomial. In the second line, the terms  $x^2$ ,  $3x$ , and  $4$  are circled in red,  $2x^2$  and  $5x$  are circled in green, and  $1$  is circled in blue. In the third line,  $x^2$  and  $2x^2$  are circled in red,  $3x$  and  $5x$  are circled in green, and  $4$  and  $1$  are circled in blue. A large red arrow points from the right side of the second and third lines down to the final result.

Ex.:

$$\begin{aligned} & (4x^2 - 2x + 10) + (-5x^2 + 5x - 6) \\ = & 4x^2 - 2x + 10 + -5x^2 + 5x - 6 \\ = & 4x^2 - 2x + 10 - 5x^2 + 5x - 6 \\ = & 4x^2 - 5x^2 - 2x + 5x + 10 - 6 \\ = & -x^2 + 3x + 4 \end{aligned}$$


$$\begin{aligned} \text{Ex.: } & (4x^2 - 2x + 10) + (-5x^2 + 5x - 6) \\ & = -x^2 + 3x + 4 \end{aligned}$$



To **ADD** polynomials, simply remove the brackets separating them and group any like terms (by adding their numerical coefficients) as well as any constants. If necessary, simplify the signs in "the middle".

**Remember:**

+	+	=	+
-	-	=	+
+	-	=	-
-	+	=	-

**You can also add polynomials vertically;  
however, this is not a commonly used method.**

**Method 1**

Add horizontally.

$$\begin{aligned}(7s + 14) + (-6s^2 + 1s - 6) \\ = 7s + 14 - 6s^2 + 1s - 6 \\ = -6s^2 + 7s + 1s + 14 - 6 \\ = -6s^2 + 8s + 8\end{aligned}$$

Remove the brackets.

Group like terms.

Combine like terms by adding their coefficients.

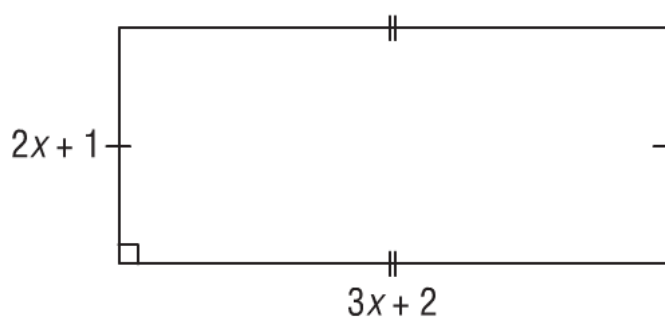
**(Ex. 1,  
page 227)**

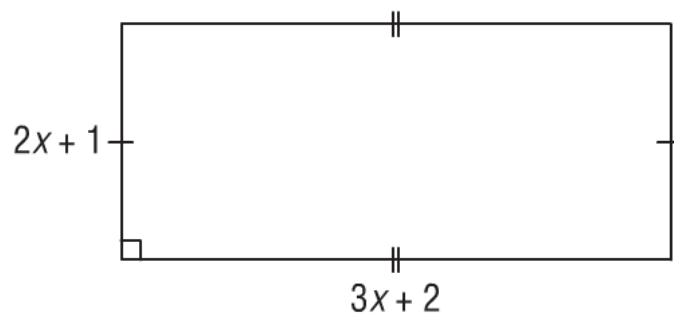
**Method 2**

Add vertically. Align like terms, then add their coefficients.

$$\begin{array}{r} 7s + 14 \\ + -6s^2 + 1s - 6 \\ \hline -6s^2 + 8s + 8 \end{array}$$

Write a polynomial for the **perimeter** of this rectangle. Show what you're actually adding together, then simplify.





$$\begin{aligned} & (2x + 1) + (3x + 2) + (2x + 1) + (3x + 2) \\ = & 2x + 1 + 3x + 2 + 2x + 1 + 3x + 2 \\ = & 10x + 6 \end{aligned}$$

A red arrow points from the final result  $10x + 6$  back to the first two terms of the second line,  $2x + 1 + 3x + 2$ .

Please review "EXAMPLE 3" on page 228 -  
"Adding Polynomials in Two Variables"

Add:  $(2a^2 + a - 3b - 7ab + 3b^2) + (-4b^2 + 3ab + 6b - 5a + 5a^2)$

**A Solution**

$$\begin{aligned} & (2a^2 + a - 3b - 7ab + 3b^2) + (-4b^2 + 3ab + 6b - 5a + 5a^2) \\ &= 2a^2 + a - 3b - 7ab + 3b^2 - 4b^2 + 3ab + 6b - 5a + 5a^2 \\ &= 2a^2 + 5a^2 + a - 5a - 3b + 6b - 7ab + 3ab + 3b^2 - 4b^2 \\ &= 7a^2 - 4a + 3b - 4ab - b^2 \end{aligned}$$

## CONCEPT REINFORCEMENT:

### *MMS9*

**Page 228: #3**

**Page 229 : #6, #8, #9, THEN #7 & #10a (i, ii, iii, iv)**

**Page 230 : #12, #14, #16, #17 & #18a**

**NOTE: THERE WILL BE A SHORT QUIZ ON THURSDAY, DEC. 17 ON SECTIONS 5.1 (Modelling Polynomials), 5.2 (Like Terms and Unlike Terms), 5.3 (Adding Polynomials) and 5.4 (Subtracting Polynomials).**