Chapter 5 Booklet
Polynomials

Name:_____

Due Date: _____

MATH 9 – POLYNOMIALS
REGULAR ASSESSMENT RECORD

Name: _____ Class: _____

Category	Topic	Due Date	Mark
5.1	***The Language of Mathematics***		
	Pg. 179/180 Q. 3, 4, 5, 7, 8, 10, 11, 14, 15, 17, 19, 21		
	Pg. 181/182 Q. 23, 24, 26, 28, 30		
5.2	***Equivalent Expressions***		
	Pg. 187/188 Q. 2, 4, 6, 7, 9, 11, 12, 16, 17, 19		
	Pg. 189 Q. 21, 22, 25		
5.3	***Adding and Subtracting Polynomials***		
	Pg. 195/196 Q. 3, 5, 7, 8, 11, 12		
	Pg. 197/198 Q. 15, 16, 17, 21, 24		
	Pg. 199 Q. 27, 29		
Review	Pg. 200 Q. 1 – 28		

At the end of this unit you will be assessed on the following:

- ☐ 1. I can identify constant terms, coefficients, and variables in polynomial expressions.
- ☐ 2. I can define, in my own words, what a polynomial is.
- ☐ 3. I can recognize polynomials from a list of expressions.
- ☐ 4. I can identify a monomial, binomial, and trinomial.
- ☐ 5. I can identify the degree of a given polynomial.
- ☐ 6. I can evaluate polynomial expressions by substituting a variety of given values of the variable.
- ☐ 7. I can perform the operations of addition and subtraction on polynomial expressions
  - Concretely with Algebra Tiles
  - Pictorially with Algebra Tile diagrams
  - Symbolically with variables
- ☐ 8. I can identify the error(s) in a given simplification of a given polynomial expression.

5.1 The Language of Mathematics

Mathematics has its own vocabulary.

A study of algebra includes working with polynomials. They are named by the number of **terms (an expression formed from a single letter, number or letter and number**.

Monomial – has only one term.
Example 1)

Binomial – has two terms.
Example 2)

Trinomial – has three terms.
Example 3)

Polynomial- more than three terms.
Example 4)

Try Question:

Expression	Number of Terms	Name
$4xy + 3$		
$7a^2 - 2ab + b^2$		
$5x + y + z - 6$		
1.3		

The **degree of a term** is the sum (+) of the exponents on the variables.

Example 5)

a) $3xz$ can be written as $3x^1z^1$ so the degree is $1 + 1 = 2$

b) $5x^3$ has a degree of 3

c) 7 could be written as $7\,x^0$ so the degree of this term is 0.

The **degree of a polynomial** is the degree of the highest-degree term in the polynomial.

Example 6)

a) $4x^4 - 5x^2 + 6$
has a degree of 4.

Try Question:
What is the degree of each polynomial expression?

1) $5x^3 - 6x + 2$

2) $4x^2y^2 - 7xy$

3) 8

4) $6x + 7x^3 - 9$

Terms:

Coefficients - The numerical part of a term

Variables - The letter part of a term

Note: Variables are usually written in alphabetical order

Term	Coefficient	Variable(s)
$5x^2$	5	x
$\frac{3}{4}$ ab	$\frac{3}{4}$	a & b
-xyz	-1	x, y, & z

Constant: A term with no variable

e.g. The polynomial $3x^2 - 5x - 7$ has a constant of -7

Leading Coefficient: The coefficient of the term with the highest degree

e.g. The polynomial $3x^2 - 5x - 7$ has a leading coefficient of 3

Try Question:

Give an example of a polynomial with the following characteristics

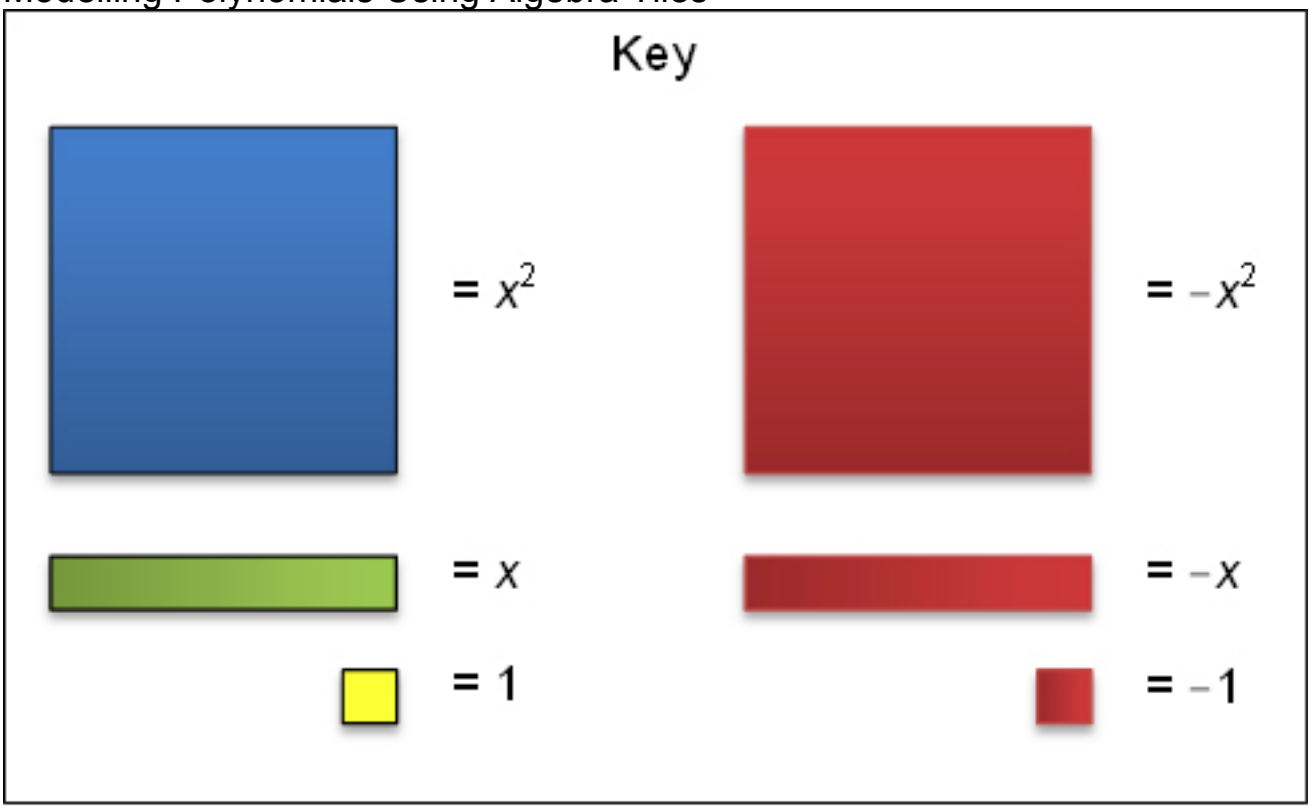
a) A binomial with three variables and a degree of four

b) A monomial with a fractional coefficient and a degree of two

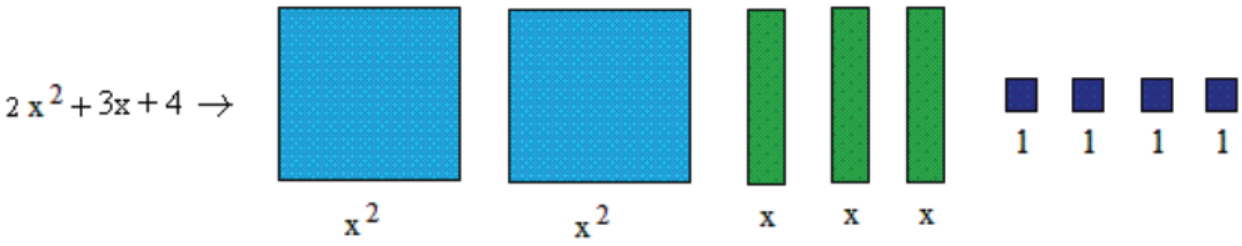
c) A trinomial with one variable, a degree of three, and a negative constant

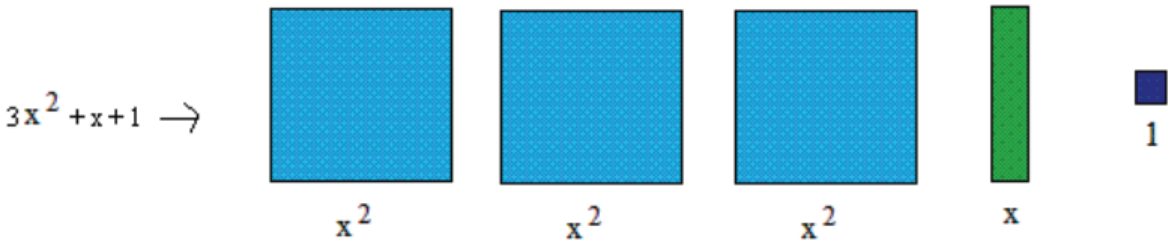
d) A binomial with a leading coefficient of - 1

Modelling Polynomials Using Algebra Tiles



When we show Algebra tiles on paper:
we shade in the positive ones and leave the negative ones white.





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

Key Ideas:

1) Algebra uses symbols to represent unknown numbers. These symbols are often letters called variables.
2) Polynomials are made up of terms. Terms are connected by addition or subtraction.
3) Polynomials can have one or more terms. They are named by the number of terms: monomial, binomial, trinomial.
4) Each term has a degree, found by adding the exponents on the variables.
5) A polynomial has the same degree as its highest-degree term.
6) You can use algebra tiles to model polynomials.

Practice Problems:

5.1 The Language of Mathematics, Pages 179 – 182 DUE DATE: _____

Page 179, #3	Page 179, #4
Page 179, #5	Page 179, #7
Page 179, #8	Page 179, #10

Page 179, #11	Page 180, #14
Page 180, #15	Page 180, #17
Page 180, #19	Page 181, #21

Page 181, #23	Page 181, #24
Page 181, #26	Page 181, #28
Page 181, #30	

5.2 Equivalent Expressions

Equivalent Expressions

Like Terms: Terms that differ only by their coefficients.
(They have the same variables with the same exponents)

e.g. $3x$ and $5x$ are like terms
$9x$ and $4x^2$ are not like terms
$\frac{1}{2}xy$ and $-xy$ are like terms
$7x$ and $8y$ are not like terms
$3xy^2$ and $5x^2y$ are not like terms

Example 1)
Which of the following is a like term to $\frac{2xy}{3}$?

a) $\frac{2x}{3}$
b) $-5x^3y$
c) $4xy^2$
d) $-xyz$
e) $-8xy$
f) None of the above

Example 2)
Which of the following is a like term to $7a^3b^2c$?

a) $-3a^2b^3c$
b) $7ab^3c^2$
c) $-10abc$
d) $9a^3bc^2$
e) $3a^2bc^2$
f) None of the above

Try Questions:

1)
Which of the following is a like term to $\frac{2xy}{3}$?

a) $\frac{2x}{3}$
b) $-5x^3y$
c) $4xy^2$
d) $-xyz$
e) $-8xy$
f) None of the above

2)
Which of the following is a like term to $-23x^2y^2$?

a) $5xy^2$
b) $-14xy$
c) $23x^2y$
d) $14x^2y^2$
e) $6xy^3$
f) None of the above

3)
Which of the following is a like term to $18xyz^4$?

a) $9xy^4z$

b) $-33xyz^4$

c) $2xyz$

d) $20x^4y^4z^4$

e) $7x^4yz$

f) None of the above

Combining Like Terms: Like terms are grouped together by adding the coefficients

e.g $4x^2 + 5x - 3 + 8 - x + 2x^2$ can be simplified to $6x^2 + 4x + 5$

Try Question: Model the expression. Then combine the like terms.

1) $5x - 3x^2 + 2x - x^2$

2) $2x - 6 - 2x + 1$

Key Ideas:

1) Like terms differ by only their numerical coefficient (same variables with exponents).
2) Like terms can be combined.
3) Like terms: - 7x and 3x, w^2 and $0.5w^2$
4) Unlike terms: 6x and $3x^2$, m^2n and mn^2

Questions Page 187-189 DUE:_____

Page 187, #2	Page 187, #4
Page 187, #6	Page 187, #7

Page 187, #9	Page 187, #11

Page 188, #12	Page 187, #16
Page 188, #17	Page 188, #19

Page 189, #21	Page 189, #22

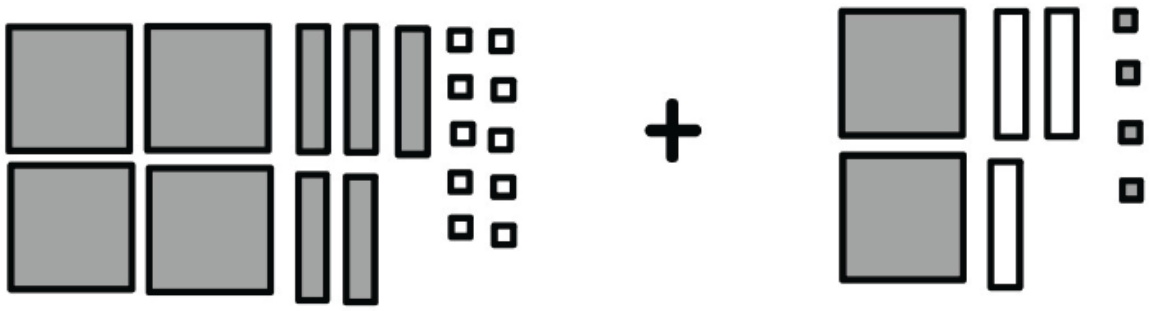
Page 189, #25

5.3 Adding and Subtracting Polynomials

Adding Polynomials

Addition: Collect like terms and order in descending order

e.g. $(4x^2 + 5x - 10) + (2x^2 - 3x + 4)$



Example:

$(2x^2 + x - 7) + (x^2 - 4x - 2)$

Try questions:

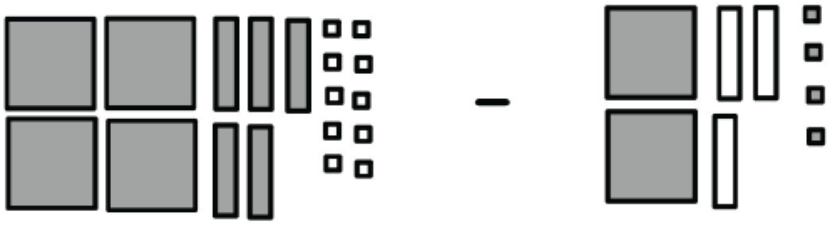
1) $(2a - 1) + (6 - 4a)$

2) $3t^2 - 5t + t^2 + 2t + 1$

Subtracting Polynomials

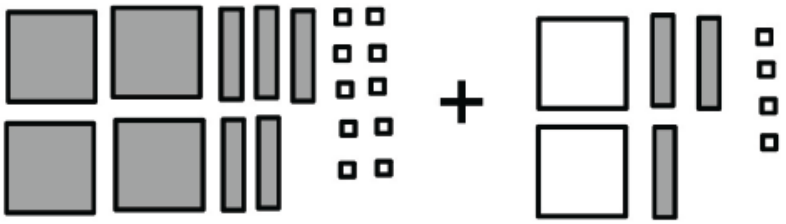
Subtraction: Add the opposite polynomial. Then collect like terms.

e.g. $(4x^2 + 5x - 10) - (2x^2 - 3x + 4)$



$(4x^2 + 5x - 10) + (-2x^2 + 3x - 4)$

This is the opposite polynomial



Write the opposite polynomial

a) x

b) 5-3x

c) $7x^2 + 5x - 1$

Example:

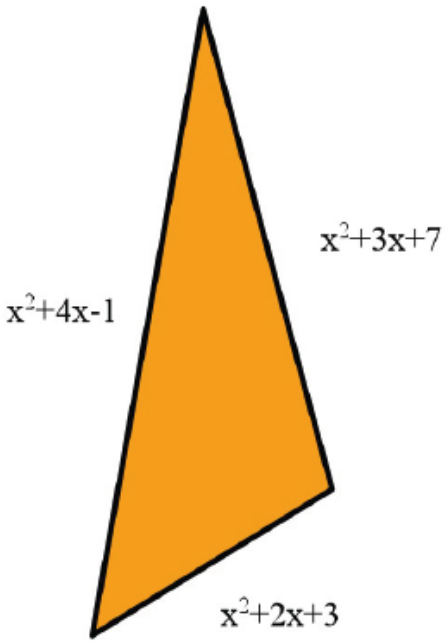
$(2x^2 + x - 7) - (x^2 - 4x - 2)$

Try Questions:

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

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

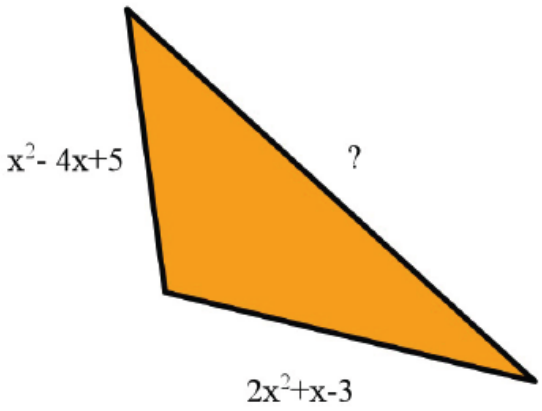
Example:



P=

Determine the perimeter if x = 3 cm

Example:



$P = 5x^2-7x+3$

Determine the length of the missing side

Key Ideas:

1) You can add or subtract polynomials. You can use algebra tile models to help simplify the expression.
2) The opposite of a polynomial is found by taking the opposite of each of its terms.
3) To subtract a polynomial, you can add the opposite terms.

Questions Page 195-199 DUE:_____

Page 195, #3	Page 195, #5

Page 195, #7	Page 195, #8
Page 196, #11	Page 196, #12
Page 197, #15	Page 197, #16

Page 198, #17	Page 198, #21
Page 198, #24	Page 199, #27
Page 199, #29	

Review Page 200 DUE:_____

Page 200, #1-6	Page 200, #7
Page 200, #8	Page 200, #9
Page 200, #10	Page 200, #11

Page 200, #12	Page 200, #13
Page 200, #14	Page 200, #15
Page 200, #16	Page 200, #17

Page 200, #18	Page 200, #19
Page 200, #20	Page 200, #21
Page 200, #22	Page 200, #23

Page 200, #24	Page 200, #25
Page 200, #26	Page 200, #27
Page 200, #28	