

Basic Vocabulary and Skills

- **term** → a number, a variable, or the product of a number and one or more variables. Ex: 3, x⁴, or 5y²

- constant – a term that has no variables (in other words...represents a Number)
- coefficient – the numerical part of a term (Ex: 4a²bc³ where the coefficient is 4)
- like term(s) – terms that have exactly the SAME variable(s) including their EXONENTS

Ex 1: Are the following like terms?:
 3x and -2x → Yes No 4ab and 2b → Yes No
 5m and 6m² → Yes No 3xy²z³ and -z³xy² → Yes No

- **(to) simplify (an expression)** → to put an expression in a form where there are no grouping symbols and no like terms () [] fraction bars (sometimes)

- to get rid of grouping symbols → use the distributive property {ex: 2(3x+4) → 6x+8}
- to combine like terms → add or subtract the coefficients and constants of each like term and keep the variable(s) ex: x+3x-3+2 → 4x-1

Ex 2: Simplify the following: 3(x-4) - 5(2x+3) = 3x-12-10x-15 → -7x-27

polynomial → a monomial or the sum/difference of two or more monomials

- standard form of a polynomial – a simplified form of a polynomial where the DEGREE of its monomial terms are written so that they DEcrease from left to right →
- degree of a polynomial – the highest exponent or the highest sum of its exponents of its monomial terms.

Below is a chart that classifies each type of polynomial:

Degree	Name Based Degree
0	Constant
1	Linear
2	Quadratic
3	Cubic
4 or more	"th" degree

ie: 5x⁸ - eighth degree

Number of Terms	Name Based # of Terms
1	monomial
2	binomial
3	trinomial
4 or more	polynomial

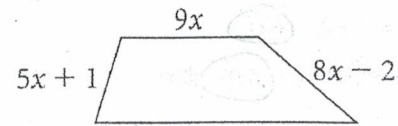
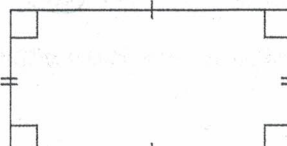
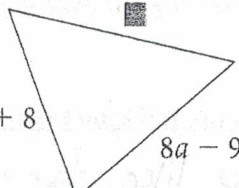
Ex 3: Complete the chart below.

Given Problem	Put in Standard Form	Classification
a.) <u>3a² + 5a - 4 + 5a² - 8</u>	<u>8a² + 5a - 12</u>	deg: 2 # terms: 3 <u>Quadratic Trinomial</u>
b.) <u>4x - (3 - 2x) + 3x</u> <u>4x - 3 + 2x + 3x</u>	<u>9x - 3</u>	deg: 1 # terms: 2 <u>Linear Binomial</u>

Adding and Subtracting Polynomials

- When adding polynomials → combine like terms (Adding coefficients, NOT exponents)
- When subtracting polynomials → CHANGE the sign(s) in the 2nd polynomial (use the distributive property)
- Make sure you've collected ALL like terms and polynomial is in STANDARD FORM

Ex 4: Simplify each problem.

<p>a.) $(4x^2 + 6x + 7) + (1 + 2x^2 - 9x)$ *Because it is addition, just add!!</p> <p>$6x^2 - 3x + 8$</p>	<p>b.) $(2x^3 + 5x^2 - 3x) - (x^3 - 8x^2 + 9)$</p> <p>$2x^3 + 5x^2 - 3x - x^3 + 8x^2 - 9$</p> <p>$x^3 + 13x^2 - 3x - 9$</p>	
<p>c.) Find the perimeter of the figure.</p>  <p>* ADD UP ALL THE SIDES! *</p> <p>$P = 5x + 1 + 9x + 8x - 2 + 17x - 6$</p> <p>$P = 39x - 7$</p> <p>$39x - 7$ is the perimeter</p>	<p>d.) Find the perimeter of the figure where the length is $4x + 7$, the width is $2x - 5$, and $x = 4$.</p>  <p>$l = 4x + 7 \rightarrow 4(4) + 7 = 23$</p> <p>$w = 2x - 5 \rightarrow 2(4) - 5 = 3$</p> <p>$P = 2(23) + 2(3)$</p> <p>Perimeter is 52</p>	<p>e.) Find the missing length given the perimeter = $23a - 7$.</p>  <p>$6a + 8 + 8a - 9 = 14a - 1$</p> <p>$23a - 7 - (14a - 1)$</p> <p>$23a - 7 - 14a + 1$</p> <p>$9a - 6$</p>

Multiplying a Monomial: Using the Distributive Property

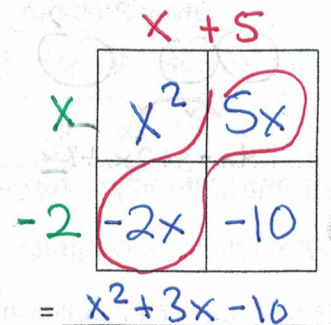
- Use the distributive Property when multiplying a monomial to a polynomial
- Remember to ADD the exponents when multiplying exponents with the SAME base.
- Make sure answer is completely SIMPLIFIED and polynomial is in STANDARD FORM!

Ex 5: Completely simplify.

<p>a.) $2x(5x^2 + x - 6)$</p> <p>$10x^3 + 2x^2 - 12x$</p>	<p>b.) $6x(x + 5) + 2(4 - x) - x^2(6 - 5x)$</p> <p>$6x^2 + 30 + 8 - 2x - 6x^2 + 5x^3$</p> <p>$5x^3 + 28x + 8$</p>	<p>c.) $4a^2b^3(2a^3b - 3ab^2)$</p> <p>$8a^5b^4 - 12a^3b^5$</p>
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Multiplying a Binomial to a Binomial: Using the Box Method

- When multiplying a BINOMIAL to a BINOMIAL Ex: $(x + 5)(x - 2) \rightarrow$
- Make a square and cut it into 4 boxes
- Place the terms of the 1st Term on top of the boxes
- Place the terms of the 2nd Term on the left side of boxes
- Multiply each term from both binomials by lining up row by column
- then combine like terms by referring to the box's diagonal(s)



Ex 6: Multiply each binomial using the box method.

a.) $(x - 6)(x + 1)$

	$x - 6$	
x	x^2	$-6x$
$+1$	x	-6

= $x^2 - 5x - 6$

b.) $(2w + 3)(w + 4)$

	$2w + 3$	
w	$2w^2$	$3w$
$+4$	$8w$	12

= $2w^2 + 11w + 12$

c.) $(9a - 8b)(7a - 2b)$

	$9a - 8b$	
$7a$	$63a^2$	$-56ab$
$-2b$	$-18ab$	$16b^2$

= $63a^2 - 74ab + 16b^2$

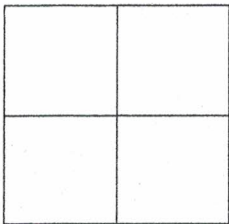
Multiplying Binomials (Special Cases): Using the Box Method

- Special Case # 1 – (Binomial Squared)² → Example: $(a+b)^2 \rightarrow (a+b)(a+b) \rightarrow a^2 + ab + ab + b^2$
where the Middle term will double. Box or FOIL $a^2 + 2ab + b^2$
- Special Case # 2 – Difference of Squares → Example: $(x+y)(x-y) \rightarrow x^2 - y^2$
where the middle terms cancel out.
- Special Case # 3 – when multiplying a binomial to a trinomial → _____
where follow same process as before but will have _____

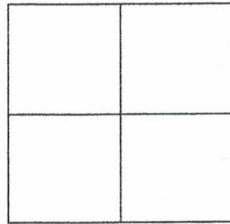
Geometry Concepts (of rectangular shapes): Area = _____ Volume = _____

Ex 7: Multiply each binomial using the box method.

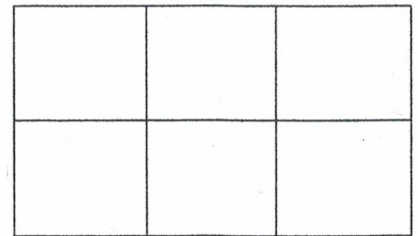
a.) $(4x - 5)^2$



b.) $(2x + 3)(2x - 3)$

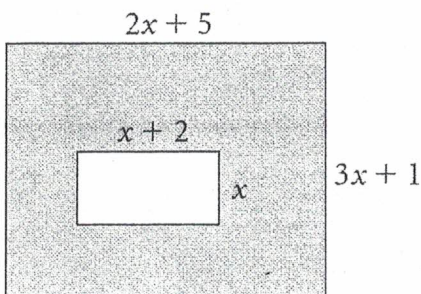


c.) $(4x^2 + x - 6)(3x + 4)$



= _____ = _____ = _____

d.) Find the area of the shaded region.



Area of Shaded Region
