

POLYNOMIALS: INTRODUCTION**MONOMIALS:****EXAMPLES:**

-4	A number
y	A variable
a^2	The product of variables
$\frac{1}{2}x^2y$	The product of numbers and variables

NON-EXAMPLES:

2^x	Variable as an exponent
$x^2 + 3$	A sum
$5a^{-2}$	Negative exponent
$\frac{3}{x}$	A quotient

Examples: Determine if each expression is a monomial.

1. $-4xy$

2. $a^2 - 8$

3. $\frac{x}{5}$

4. $7z^{-1}$

5. b^7

POLYNOMIAL: A polynomial is a _____ or the _____ of different monomials.

Determine which expressions are polynomials:

6. $2q$

7. $d + \frac{c}{d}$

8. $p + q$

9. $ab - \frac{a}{4}$

10. $x^2 + 4x - 8$

11. $7y^3 - 5y^{-2} + 4y$

SPECIFIC TYPES OF POLYNOMIALS

<u>BINOMIAL:</u>	<u>TRINOMIAL:</u>
<u>Examples:</u>	<u>Examples:</u>

Examples #12 - 19: Determine if each expression is a monomial, binomial, trinomial, or not a polynomial.

12. $2m - 7$

13. $x^2 + 3x - 4 - 5$

14. $\frac{5}{2x} - 3$

15. $3y^2 - 6 + 7y$

16. $3x + 8x - 5x^2$ 17. $8x^3y^2z$ 18. $2a^2 + 3ab - 5ba$ 19. $9r + 11 - 5r^2$

DEGREE: Based on the exponents of the variables.

- The degree of a MONOMIAL:

- The degree of a POLYNOMIAL:

Examples: Find the degree of each polynomial.

20. $5mn^2$

22. $5a^2 + 3$

24. $3x^2 - 7x$

21. $9x^3yz^6$

23. $-4x^2y^2 + 3x^2 + 12$

25. $8m^3 - 2m^2n^2 - 11$

REORDERING TERMS OF A POLYNOMIAL BASED ON DEGREE:

MOVE TERMS AND KEEP THE SIGN WITH THE TERM

Example: Arrange the polynomials in descending order according to the powers of the x.

a) $6x^2 + 5 - 8x - 2x^3$

d) $3a^3x^2 - a^4 + 4ax^5 + 9a^2x$

b) $7x^2 - 11x^4 + 8 - 2x^5$

e) $15x^5 - 2x^2y^2 - 7yx^4 + x^3y$

c) $25x^6 - 3x^2 + 7x^5 + 15x^8$

POLYNOMIALS: ADDITION AND SUBTRACTION**WARM UP ACTIVITY: Simplify the following**

1) $3x - 2y + 4y - 6x$

3) $4z + 2t + 3z - t$

5) $8a + 6b + 6a + 2b$

2) $3x - 12y - 2x^2 + 6y$

4) $5a + 3b - 2c - 8a$

ADDING AND SUBTRACTING POLYNOMIALS:

- When adding and subtracting polynomials, you **COMBINE LIKE TERMS**.
- Be careful of parentheses and positive or negative signs with the operations.

Exp 1: $(3x^2 - 4x + 8) + (2x - 7x^2 - 5)$

Exp 4: $(6y^2 + 8y^4 - 5y) - (9y^4 - 7y + 2y^2)$

Exp 2: $(3n^2 + 13n^3 + 5n) - (7n + 4n^3)$

Exp 5: $(7y^2 + 2y - 3) + (2 - 4y + 5y^2)$

Example 3: $(2b^2 + 8ab^3 + 4b) - (9b - 5ab^3)$

Exp 6: $(3x^2 + 5x + 2) - (4 - 2x) + (5x^2 + 7)$

PRACTICE PROBLEMS: Simplify each expression

1. $x^2 + 2x - 3 + 2x^2 - 7x + 9$

2. $(3x + 5) + (2x - 3)$

$$3. (-2x + 3) + (4x - 3)$$

$$4. (2x^2 + 2x - 4) + (x^2 + 3x + 7)$$

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

$$6. (t^2 - 1) + (2t + 3)$$

$$7. (2x^2 + 3) + (x^2 - 2x - 1)$$

$$8. (2x^2 + 5xy + 3y^2) + (8x^2 - 7y^2)$$

$$9. (z^2 + 2z - 5) + (3z^2 - z + 4)$$

$$10. (4m - 3n) + (2n + 5m)$$

$$11. (6x + 5) - (3x + 1)$$

$$12. (2a^2 - 3a) + (5b - b^2) + (2a - 8b)$$

$$13. (3z^2 + 5) - (-4z + 2z^2) - (z - 3)$$

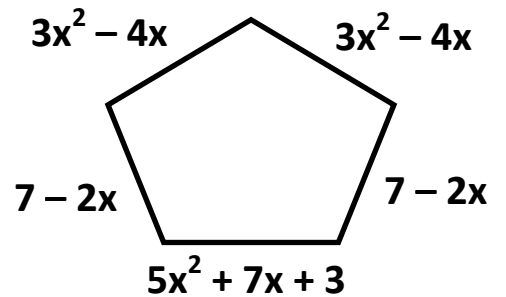
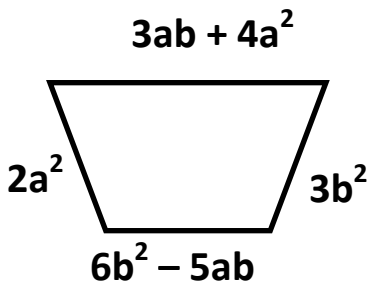
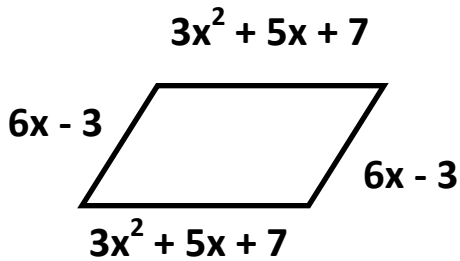
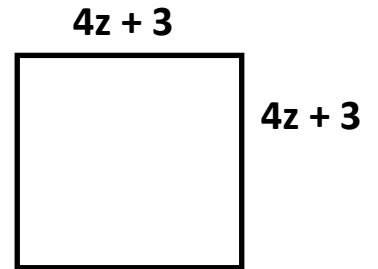
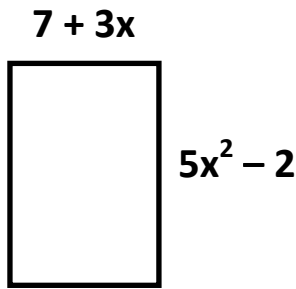
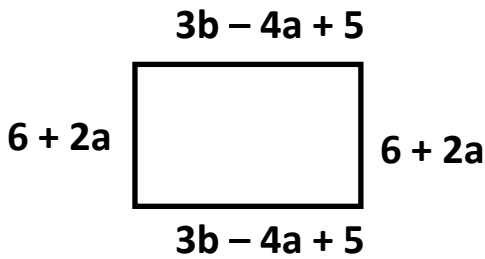
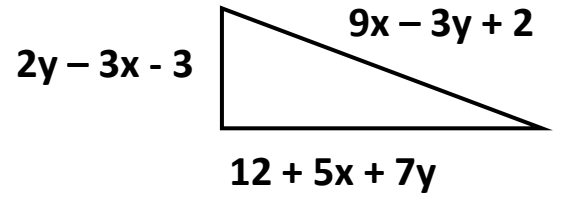
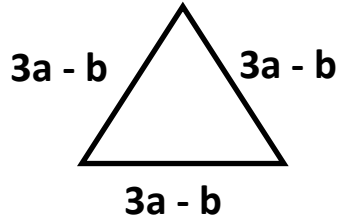
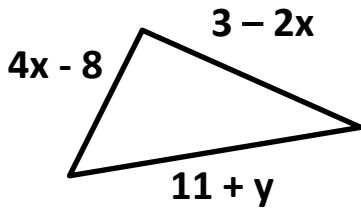
$$14. (3x - 2) - (5x - 4) + (19 + 2x)$$

$$15. (10x^2 + 8x) - (6 + 3x^2) + (2x - 9)$$

$$16. (6m^2 + 7) - (-2m^2) + (2m - 3)$$

Find the PERIMETER of the shape.

Equation: Perimeter = Sum of all the sides



CC Math I Standards: Adding and Subtracting Polynomials WORKSHEET

Unit 6

NAME: _____

Find the sum or difference:

1) $(x^3 - 7x + 4x^2 - 2) - (2x^2 - 9x + 4)$

2) $(3a + 2b - 7c) + (6b - 4a + 9c)$

3) $(5y^2 - 2xy + 6x^2 - 3x + 7y - 9) + (3x^2 - 4x + 5) - (5y^2 - 3y + 6)$

Word Problems:

1) Bob mowed $(2x^2 + 5x - 3)$ yards on Monday, $(4x - 7)$ yards on Tuesday, and $(3x^2 + 10)$ yards on Wednesday.

a. How many yards did he mow in the three days?

b. If Bob mowed $14x^2 + 12x - 3$ yards total for the entire week, how many yards did he mow during the rest of the week?

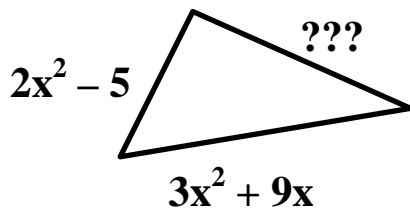
2) Molly has $(4x + 10)$ dollars and Ron has $(-5x + 20)$ dollars.

a. How much money do they have altogether?

b. How much more money does Molly have than Ron?

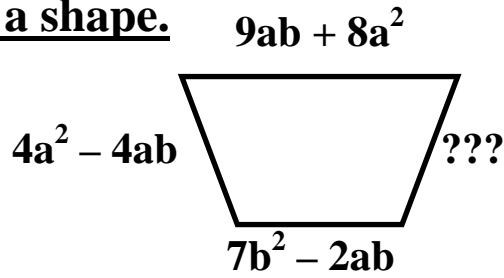
3) Ross has $(8x - 5)$ tickets for Chuck E Cheese. He is going to play today and wants to buy a prize that is $(15x + 1)$ tickets. How many tickets must he win to have enough tickets to buy the prize?

Find the missing side of a shape.



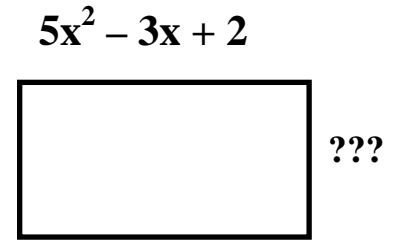
Perimeter

$$5x^2 + 7x + 12$$



Perimeter

$$9b^2 - 2ab + 12a^2$$



Perimeter

$$14x^2 + 4x - 8$$

- 4) The measure of the perimeter of a triangle is $37s + 42$. It is known that two of the sides of the triangle have measures of $14s + 16$ and $10s + 20$. Find the length of the third side.
- 5) A triangle has a perimeter of $10a + 3b + 12$ and has sides of length $3a + 8$ and $5a + b$, what is the length of the third side?
- 6) For a rectangle with length of $3x + 4$ and perimeter of $10x + 18$, what is the width of the rectangle?
- 7) A rectangle has a perimeter of $12y^2 - 2y + 18$ and has a width of $4y^2 - y + 6$. What is the length of the rectangle?

POLYNOMIALS: Multiplication of Monomial and Polynomial
DISTRIBUTIVE PROPERTY REVIEW

1) $-4(2 - 6x)$

2) $3(5p + q - 3r)$

3) $-2(-x - 7y)$

SIMPLIFYING PRACTICE PROBLEMS:

1) $(4x + 7x)3$

2) $12z - 5z + 9z^2$

3) $-7(-6m + 11m)$

4) $4(11 - 3x)$

5) $-5(5a - 3b - 6)$

6) $-2(x^2 - 8x + 3x^3 - 6)$

7) $9x - 4(6 - 3x)$

8) $5(3b - 2a) - 7b$

9) $12 + 3(7x + 2)$

10) $6(4y + 3z) - 11z$

11) $5 + 2(4m - 7n) + 9n$

12) $12 - 7(3 - 5r) + 8r$

$$13) 19x + 1(2 + 4x) - 18$$

$$14) 2(2x + 6) + 3(5x - 7)$$

$$15) 6(4a - 2b) - 2(9b - 7a)$$

$$16) 5(3x + 2y) - 4(7y + 8z)$$

LAWS of EXPONENTS REVIEW:

Multiply Coefficients and Add Exponents of Same Variable

$$1) (3x^2)(7x^3)$$

$$2) 8m^5 \cdot m$$

$$3) t^3 \cdot 6t^7$$

$$4) (4y^4)(-9y^2)$$

$$5) 3r^5 \cdot 2r^2 \cdot 7r^6$$

$$6) (-2p^3r)(11r^4p^6)$$

$$7) (6y^3x)(5y^3)$$

$$8) 7c^5a^3b \cdot 8a^2b^4c$$

$$9) (-3t^3u^2)(-4u^3t)$$

Using Law of Exponents and Distributive Property:

$$1) 4x(2x + 6)$$

$$2) 9y^2(5y - 3)$$

$$3) -6a(3a^2 - 7a - 11)$$

$$4) 3z^3(12z + 4z^3 - 1)$$

$$5) 2pq(3p^2 + 6pq + 7q^2)$$

$$6) -5xy^3(-3x^3 + 7y - 2xy)$$

MULTIPLYING A POLYNOMIAL BY A MONOMIAL:**USE THE DISTRIBUTIVE PROPERTY with VARIABLE TERMS**

Keep track of Coefficients and Exponents of Variables

Exp 1: $y(y + 5)$

Exp 2: $-2n(7 - 5n^2)$

Exp 3: $-7m(3m^2 + 4m + 5)$

Exp 4: $2ab(3a^2 - 2ab + 6b^2)$

Exp 5: $3a^3(2a^2 - 5a + 8)$

Exp 6: $-3x^3y(5yx + 6y^2)$

BOX METHOD: $6y^2(4y^2 - 9y - 7) =$

Practice. Simplify each example

1. $7(2x + 5)$

2. $4x(3x^2 - 7)$

3. $-5a(6 - 3a^2)$

4. $2m^2(5m^2 - 7m + 8)$

5. $3r(-2r^2 + 6r - 5)$

6. $6x^3y(-x + 7y - 3xy)$

7. $2y^2(7y + 3x) - 5y^3$

8. $11y(y - 3) + 13y$

9. $3(x^3 + 4x^2) + 2x(x - 7)$

10. $4(3d^2 + 5d) - d(d^2 - 7d + 12)$

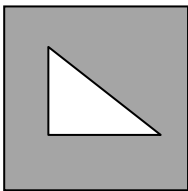
11. $3(2t^2 - 4t - 15) + 6t(5t + 2)$

SPECIAL PROBLEMS: Find the area of the shaded region in the simplest form.

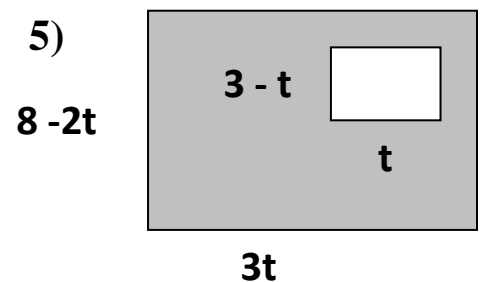
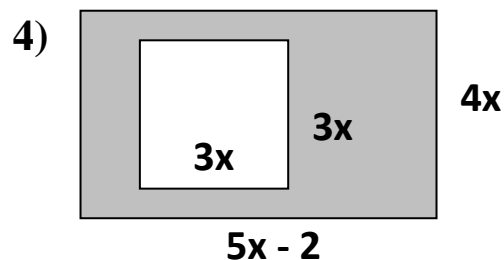
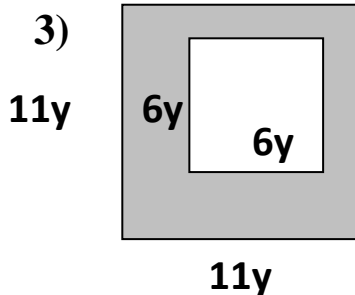
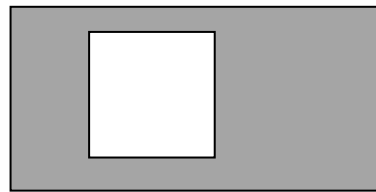
(BIG SHAPE) – (LITTLE SHAPE “HOLE”) = SHADED REGION

EXAMPLES:

1) A square of side length 8 has a triangle of base 4 and height 3 cut out of it.



2) A rectangle with width of 7 and length of 9 has a square of side length 5 cut out of it.



POLYNOMIALS: FOIL BOX METHOD Part 1

		BINOMIAL #2	
		F first terms	O outer terms
BINOMIAL #1	I inner terms	L last terms	

FOIL Box Method: The box method does the exact same multiplications as our standard FOIL method, but gives it in a graphic organizer.

- Be careful of positive and negatives.
- Combine like terms of boxes to finish.

Exp 1: $(x + 2)(x + 1)$

Exp 2: $(y + 3)(y - 4)$

Exp 3: $(a - 5)(a - 7)$

Exp 4: $(3x + 2)(x + 4)$

Exp 5: $(5b + 9)(b - 4)$

Exp 6: $(2n - 7)(3n + 3)$

Exp 7: $(2x - 5)(2x - 5)$

Exp 8: $(8r^2 - 2r)(5r + 4)$

Exp 9: $(2x + 5y)(7y - 3x)$

Practice Problems: Multiply the following binomials.

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

2. $(2x + 1)(x + 1)$

3. $(y + 4)(y - 2)$

4. $(x - 7)(x - 3)$

5. $(y - 4)(2y + 3)$

6. $(4h - 3)(3h + 2)$

7. $(m - 3)(m + 1)$

8. $(2a - 3)(a - 2)$

9. $(3x + 1)(x + 2)$

10. $(2x - 3)(2x + 2)$

11. $(3a - b)(2a + 4b)$

12. $(2x + y)(3x - 2y)$

13. $(x^2 - 4)(x + 3)$

14. $(x^2 + 6x)(x - 1)$

15. $(a^2 + 2)(a^5 + 1)$

POLYNOMIALS: FOIL BOX METHOD Part 2**WARM UP:** Simplify each expression by FOIL

1) $(3b - 5)(b - 4)$

2) $(y + 7)(y + 6)$

3) $(2n + 9)(n - 8)$

BINOMIAL TIMES TRINOMIAL: One More Column for 3rd term in trinomial**Example 1:** $(a + 3)(a^2 + 7a + 6)$

Example 2: $(4x + 9)(2x^2 - 5x + 3)$

Example 3: $(y - 5)(4y^2 - 3y + 2)$

Example 4: $(2b + 1)(b^2 - 5b + 4)$

Example 5: $(x - 6)(x^2 - 7x - 8)$ **Example 6:** $(3b^2 - 4b)(2b^2 - b + 7)$