Algebra 1 **Name:** _____
Interpreting Structure in Expressions

Definitions:

_____: a letter that stands for a particular numerical value.

_____: is a mathematical expression that consists of variables, numbers and operations.

_____: a product of numbers and variables in an algebraic expression.

_____: numbers or quantities you can multiply together to get another number/quantity.

_____: A number used to multiply a variable.

_____: A fixed value.

Caroline signs up for an online service to watch her favorite movies. The service costs $12.00 to begin and then Caroline must pay $3.50 per movie she watches. The **algebraic expression** below models her total cost.

$$\underbrace{12.00}_{\text{\_\_\_\_\_}} + \underbrace{3.50x}_{\text{\_\_\_\_\_}}$$

"x" represents the _____

Factors: _____ Coefficient: _____ Constant: _____

Example 1
Tara and two friends had dinner at a Spanish tapas restaurant that charged $6 per tapa, or appetizer. The three of them shared several tapas. The total bill included taxes of $4.32. What are the terms, factors, and coefficients of the algebraic expression that represents the number of tapas ordered?

Algebraic Expression: _____ Terms: _____

Factors: _____ Coefficient: _____ Constant: _____

Example 2
The difference of seven and five times a number.

Algebraic Expression: _____ Terms: _____

Factors: _____ Coefficient: _____ Constant: _____

Example 3
Stephanie wants to buy 4 purses that are on sale for 30% off the original price. Write an expression that represents the total cost of the purses. Let x represent the cost of one purse.

DISCOUNT PROBLEM: _____

Algebraic Expression: _____ Terms: _____

Factors: _____ Coefficient: _____ Constant: _____

You try these! ☺

Name the terms, factors, coefficients, and constants in the following algebraic expressions:

1. $3x + 5$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

2. $-6x + 4$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

3. $2j + 3k + 6m$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

4. $12x - 0.25$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

5. $100 - 3x + 12y$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

6. $4x^3 + x^2 - 15$

Terms: _____

Factors: _____

Coefficients: _____

Constants: _____

Algebra 1 **Name**_____
Interpreting Structure in Expressions

Warm-Up: Draw a line to match the expressions.

4(n + 2)	multiply n by two, then add four
2(n + 4)	add four to n, then multiply by two
2n + 4	add two to n, then multiply by four

Fill in the appropriate words for each math operation below.

half	decreased	take away	double
plus	twice	increased	add
triple	times	cubed	less than (swaps the order)
more than	minus	together	difference
quotient	square	to the power of	raised to a power
product	divide by	sum	

Addition (6 words)	Subtraction (5 words)	Division (2-3 words)	Multiplication (5-6 words)	Exponents (4 words)

"Turn Around" Words

Word	Phrase	Example
Than	Six less than a number	
From	10 subtracted from a number	

1. 12 more than a number

2. 5 less than twice a number

The presence of certain phrases in a verbal expression require the use of PARENTHESES.
- Times the sum of - times the difference of - times the quotient of

3. 5 times the sum of a and b.

4. Twice the difference of a number and 10.

5. Three times the quotient of a number and twelve.

Translate each algebraic expression into a verbal expression.

6. $8 + 3x$ _____

7. $5m - 7$ _____

8. $x^2 + 100$ _____

Translate each verbal expression into an algebraic expression.

9. The sum of a number and 10.

10. The product of 9 and x squared.

11. Nine less than g to the fourth power.

12. Eight more than 3 times a number

13. Three-fourths the square of a number

14. Two times the quotient of 12 and a number

15. 15 less than twice a number

16. The product of 5 and the cube of a number increased by the difference of 6 and x

17. Half the sum of x and y decreased by one-third y

Write an algebraic expression to describe each situation. Identify the terms, factors, coefficients, and constants.

1. Sarah is opening a new taxi service in Atlanta. It costs $4.50 to ride in her taxi plus $0.75 per mile driven.

Algebraic Expression: _____ Terms: _____

Factors: _____ Coefficients: _____

Constants: _____

2. Shane agrees to buy a package deal of monthly gym passes, and in turn receives a 15% discount. Write an algebraic expression to represent the total cost of the package with the discount, if x represents the cost of the package. ** Please simplify first!

DISCOUNT PROBLEMS: _____

Algebraic Expression: _____ Terms: _____

Factors: _____ Coefficients: _____

Constants: _____

A #1-1

Name_____ Date_____ Period_____

Why Did the Cow Keep Jumping Over the Barrel?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Translate each phrase below into an algebraic expression and find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

E	3 times a number	**18**	x + 3
O	3 more than a number	**15**	3x - 8
S	3 decreased by a number	**19**	x - 3
R	3 less than a number	**12**	3x + 8
A	one third of a number	**3**	3x
I	8 more than 3 times a number	**25**	3 - x
N	8 less than 3 times a number	**5**	x/3

S	5 times a number, increased by 8	**22**	8(x + 5)
A	5 times the sum of a number and 8	**4**	8(2x + 5)
H	5 more than 8 times a number	**2**	8x + 5
O	8 times the sum of a number and 5	**13**	2(5x + 8)
C	Twice the sum of 5 times a number and 8	**6**	5x + 8
T	2 more than five eighths of a number	**20**	5(x + 8)
W	8 times the sum of twice a number and 5	**11**	5/8x + 2

A	7 less than 4 times a number	**1**	7 - 4x
S	7 decreased by 4 times a number	**16**	2x - 9
G	9 less than twice a number	**14**	7x + 4
N	9 decreased by twice a number	**9**	4x - 7
O	9 less than half a number	**8**	7x + 4x
I	7 times a number, increased by 4	**24**	9 - 2x
R	7 times a number, increased by 4 times the number	**27**	x/2 - 9

T	9 meters higher than altitude x	**7**	x + 15
F	15 meters per second slower than speed x	**28**	x + 9
P	15 degrees hotter than temperature x	**26**	4x - 9
O	9 meters shorter than twice length x	**23**	2x - 9
C	9 years older than twice age x	**10**	2x + 9
H	$9 cheaper than 4 times price x	**17**	x - 15
M	9 centimeters less than three fourths of length x	**21**	3/4x - 9

Kuta Software - Infinite Algebra 1 Name_____

Adding and Subtracting Polynomials

Date_____ Period____

Simplify each expression.

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

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

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

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

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

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

8) $(3x^4 - 3x) - (3x - 3x^4)$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

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

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

When multiplying TWO polynomials together you are _____ *all* the terms in the first polynomial to all the terms in the second polynomial.

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

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

Binomial x Binomial

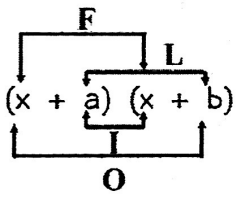
1. Multiply: $(3x + 5)(2x - 7)$

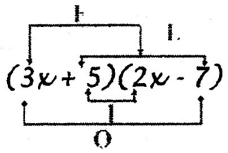
F - _____

O - _____

I - _____

L - _____





Now you try!

2. Multiply: $(2x + 4)(x + 6)$

3. Multiply: $(3x - 5)(5x^2 - x + 2)$

4. Multiply: $(4x - 3)(3x^3 - 2x^2 + 5)$

5. $(x+2)^2$

Kuta Software - Infinite Algebra 1

Name_____

Multiplying Polynomials

Date_____ Period____

Find each product.

1) $6v(2v+3)$

2) $7(-5v-8)$

3) $2x(-2x-3)$

4) $-4(v+1)$

5) $(2n+2)(6n+1)$

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

7) $(x-3)(6x-2)$

8) $(8p-2)(6p+2)$

9) $(6p+8)(5p-8)$

10) $(3m-1)(8m+7)$

11) $(2a-1)(8a-5)$

12) $(5n+6)(5n-5)$

Kuta Software - Infinite Algebra 1 Name_____

Multiplying Special Case Polynomials

Date_____ Period____

Find each product.

1) $(x+5)(x-5)$

2) $(n-1)(n+1)$

3) $(p-1)^2$

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

5) $(x-4)^2$

6) $(n+3)^2$

7) $(x-5)(x+5)$

8) $(n-5)^2$

9) $(2k^2+1)^2$

10) $(8a^2+4)(8a^2-4)$

11) $(2+5n^2)^2$

12) $(3x-7)(3x+7)$

Algebra 1
Applications with Polynomials

Name_____
Date_____

Simplify the following polynomials.

1. $(3x + 5) + (4 - x)$

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

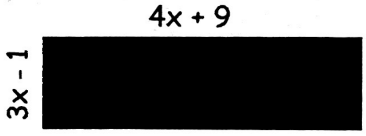
3. $25(2y^3 + 3y^2 + 4)$

4. $6x^2(3x^2 + 5x)$

5. $(a + 2)(5a - 4)$

6. $(x - 3)^2$

Applications with Polynomials



Perimeter – _____

Area - _____

Volume – _____

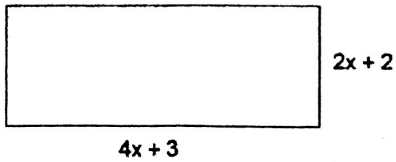
7. Find the perimeter of the rectangle above. **(Perimeter =** _____**)**

8. Find the area of the rectangle above. **(Area of a rectangle is A =** _____**)**

9. Find the volume of a cube whose side length is $x + 1$.

(Volume of a cube is V = _____**)**

10. Find the perimeter and area of the rectangle to the right.

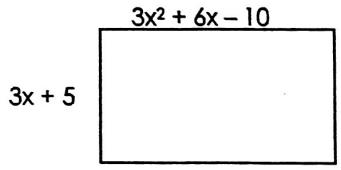


P = _____ A = _____

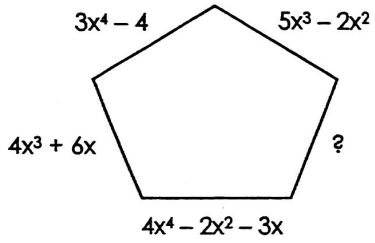
Name_____ Period_____ Date_____

Finding Perimeter and Area Using Polynomials

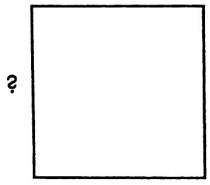
1. What is the distance around the rectangle if the length is $3x^2 + 6x - 10$ and the width is $3x + 5$?



2. If the perimeter of the pentagon below is $7x^4 + 9x^3 - 6x^2 + 10$, what is the length of the missing side?



3. If the perimeter of the **square** below is $12x^5 - 8x^2 + 20x - 4$, what is the length of one side?



4. Ana knows that the perimeter of her backyard is $(6x^2 + 14x)$ feet. If the length of her backyard is $(2x^2 + 3x - 7)$ feet, what is the width of her backyard?