Name: ____________________________________ Date: ____________________

VARIABLES, TERMS, AND EXPRESSIONS
COMMON CORE ALGEBRA II

Mathematics has developed a language all to itself in order to clarify concepts and remove ambiguity from the analysis of problems. To achieve this, though, we have to agree on basic definitions so that we can all speak this same language. So, we start our course in Algebra II with some basic review of concepts that you saw in Algebra I.

SOME BASIC DEFINITIONS

Variable: A quantity that is represented by a letter or symbol that is unknown, unspecified, or can change within the context of a problem.

Terms: A single number or combination of numbers and variables using exclusively multiplication or division. This definition will expand when we introduce higher-level functions.

Expression: A combination of terms using addition and subtraction.

***Exercise* #1:** Consider the expression $2x^2+3x-7$.

(a) How many terms does this expression contain?

(b) Evaluate this expression, without your calculator, when $x=-3$. Show your calculations.

(c) What is the sum of this expression with the expression $5x^2-12x+2$?

LIKE TERMS

Like Terms: Two or more terms that have the same variables raised to the same powers. In like terms, only the coefficients (the multiplying numbers) can differ.

***Exercise* #2:** Most students learn that to add two like terms they simply add the coefficients and leave the variables and powers unchanged. But, why does this work? Below is an example of the technical steps to combine two like terms. What real number property justifies the first step?

$$4x^2y+6x^2y=x^2y(4+6) \quad \Leftarrow \text{ Justification?}$$
$$=x^2y(10)=10x^2y$$

REAL NUMBER PROPERTIES

If $a, b,$ and c are any real numbers then the following properties are always true:

1. The Commutative Properties of Addition and Multiplication:

$$a+b=b+a \text{ and } a\cdot b=b\cdot a$$

2. The Associative Properties of Addition and Multiplication:

$$(a+b)+c=a+(b+c) \text{ and } (a\cdot b)\cdot c=a\cdot(b\cdot c)$$

3. The Distributive Property of Multiplication and Division Over Addition and Subtraction:

$$c(a\pm b)=c\cdot a\pm c\cdot b \text{ and } \frac{a\pm b}{c}=\frac{a}{c}\pm\frac{b}{c}$$

***Exercise* #3:** The procedure for simplifying the linear expression $8(2x+3)+5(3x+1)$ is shown below. State the real number property that justifies each step.

$8(2x+3)+5(3x+1)=8\cdot 2x+8\cdot 3+5\cdot 3x+5\cdot 1$ ______________________________

$=(8\cdot 2)x+24+(5\cdot 3)x+5=16x+24+15x+5$ ______________________________

$=16x+15x+24+5$ ______________________________

$=x(16+15)+24+5$ ______________________________

$=31x+(24+5)$ ______________________________

$=31x+29$ ______________________________

***Exercise* #4:** Because we used real number properties to transform the expression $8(2x+3)+5(3x+1)$ into a simpler form $31x+29$, these two expressions are **equivalent**. How can you test this equivalency? Show work for your test.

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VARIABLES, TERMS, AND EXPRESSIONS
COMMON CORE ALGEBRA II HOMEWORK

FLUENCY

1. For each of the following expressions, state the number of terms.

(a) $3x^2 - 1$

(b) $8x + 7x^2 - 2 + x^3$

(c) $7xy - 2x^2y^2 + \frac{1}{2}xy^4$

2. Simplify each of the following expressions by combining like terms. Be careful to only combine terms that have the same variables and powers.

(a) $2x^2 + 8x - 1 + 5x^2 - 2x - 8$

(b) $-5x^2 - 2x + 10 - x^2 + 7x + 5$

(c) $4x^2y - 2xy^2 + 9xy^2 - x^2y$

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

3. Given the algebraic expression $\frac{12x + 12}{x^2 - 1}$ do the following:

(a) Evaluate the expression for when $x = 7$.

(b) Evaluate the expression for when $x = 4$.

(c) Nina believes that this expression is equivalent to dividing 12 by one less than *x*. Do your results from (a) and (b) support this assertion? Explain.

4. Classify each of the following as either a monomial (single term), a binomial (two terms) or a trinomial (three terms).

(a) $4x^2$

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

(c) $16-x^2$

(d) x^2y^2+25

(e) $\frac{5x^5}{3}$

(f) $16+10t-4t^2$

5. Use the distributive property first and then combine each of the following linear expressions into a single, equivalent binomial expression.

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

(b) $2(10x+1)-3(4x-5)$

6. Which of the following is equivalent to the expression $2(x-6)+4(2x+1)+3$?

(1) $8(x-2)$

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

(2) $5(2x-1)$

(4) $10(x-1)$

____

Reasoning

7. Each step in simplifying the expressions you worked with in 5 and 6 can be justified using one of the major properties of real numbers reviewed in the lesson. Justify each step below with either the commutative, associative or distributive properties when simplifying the expression $8(3x+1)+2(5x+7)$.

$8(3x+1)+2(5x+7)=24x+8+10x+14$ ________________________________

$=24x+10x+8+14$ ________________________________

$=(24x+10x)+(8+14)$ ________________________________

$=x(24+10)+22$ ________________________________

$=34x+22$ ________________________________

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SOLVING LINEAR EQUATIONS
COMMON CORE ALGEBRA II

We will learn many new equation solving techniques in Algebra II, but the most basic of all equations are those where the variable, say *x*, is only raised to the first power. These are known as **linear equations**. You need to have good fluency with solving these equations in order to be successful in the beginning portions of Algebra II. Let's start with some practice.

***Exercise* #1:** Solve each of the following linear equations for the value of *x*.

(a) $3x+5=26$

(b) $8x-7=4x-5$

(c) $\frac{x+8}{2}=-6$

(d) $6(x+4)-2(x-1)=2x+20$

It is important to understand that each step in solving one of these equations can be justified by either using one of the properties of real numbers (from the last lesson) or a property of equality (such as the additive or multiplicative properties).

***Exercise* #2:** Justify each step in solving $2(x+7)+4x=44$ using either a property of real numbers (commutative, associative, or distributive) or a property of equality (additive or multiplicative).

$2(x+7)+4x=44$

$2x+14+4x=44$ ____________________________________

$2x+4x+14=44$ ____________________________________

$x(2+4)+14=44$ ____________________________________

$6x+14=44$

$6x+14-14=44-14$ ____________________________________

$6x=30$

$\frac{6x}{6}=\frac{30}{6}$ ____________________________________

$x=5$

Strange things can sometimes happen when solving linear (and other) equations. Sometimes we get no solutions at all, in which case the equation is known as **inconsistent**. Other times, any value of x will solve the equation, in which case it is known as an **identity**.

***Exercise* #3:** Try to solve the following equation. State whether the equation is an **identity** or **inconsistent**. Explain.

$$6x-2(x+4)=3(x+2)+x-5$$

***Exercise* #4:** An identity is an equation that is true for all values of the substitution variable. Trying to solve them can lead to confusing situations. Consider the equation:

$$2x-6+x-1=3(x-3)+2$$

(a) Test the values of $x=5$ and $x=3$ in this equation. Show that they are both solutions.

(b) Attempt to solve the equation until you are sure this is an identity.

***Exercise* #5:** Which of the following equations are identities, which are inconsistent, and which are neither?

(a) $8x-2(x+3)=5(x-1)+x$

(b) $\dfrac{4x+2}{2}+8=2x+9$

(c) $2x+8-(x-7)=2(2x-3)$

(d) $2x+1+2(x-1)=\dfrac{16x-4}{4}$

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SOLVING LINEAR EQUATIONS
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Solve each of the following linear equations. If the equation is inconsistent, state so. If the equation is an identity, also state so. Reduce any non-integer answers to fractions in simplest form.

(a) $7x+5=2x-35$

(b) $\frac{x}{3}-7=-5$

(c) $4x+5=4x-1$

(d) $\frac{5(x-3)}{2}-1=14$

(d) $3(x-1)+2=x+9$

(e) $4x-(2x-1)=x+5+x-6$

(f) $5(2x-6)+2(4x+3)=8x-9$

(g) $\frac{2x+5}{6}=\frac{x}{18}$ (Cross multiply to begin)

(h) $\frac{10x-4}{2}+7=5(x+1)$

(i) $18-2(x+7)=\frac{8x-20}{2}-2$

APPLICATIONS

2. Laura is thinking of a number such that the sum of the number and five times two more than the number is 26 more than four times the number. Determine the number Laura is thinking of.

3. As if #2 wasn't confusing enough, Laura is now trying to come up with a number where three less than 8 times the number is equal to half of 16 times the number after it was increased by 1. She can't seem to find a number that works. Explain why.

4. When finding the intersection of two lines from both Algebra I and Geometry, you first "set the linear equations equal" to each other. Find the intersection point of the two lines whose equations are shown below. Be sure to find both the *x* and *y* coordinates.

$$y = 5x + 1 \text{ and } y = 2x - 11$$

REASONING

5. Explain why you cannot find the intersection points of the two lines shown below. Give both an algebraic reason and a graphical reason.

$$y = 4x + 1 \text{ and } y = 4x + 10$$

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COMMON ALGEBRAIC EXPRESSIONS
COMMON CORE ALGEBRA II

In Algebra II we will spend a lot of time evaluating and simplifying algebraic expressions. Just to be clear:

ALGEBRAIC EXPRESSION

Algebraic expressions are just combinations of constants and variables using the typical operations of addition, subtraction, multiplication, and division along with exponents and roots (square roots, cube roots, etcetera).

It is important to be able to evaluate algebraic expressions for values of the variables contained in them.

***Exercise* #1:** Consider the algebraic expression $4x^2+1$.

(a) Describe the operations occurring within this expression and the order in which they occur.

(b) Evaluate this expression for the replacement value $x=-3$. Show each step in your calculation. Do not use a calculator.

***Exercise* #2:** Consider the more complex algebraic expression (known as a rational expression) $\frac{4x+3}{x^3-7}$.

(a) Without using your calculator, find the value of this expression when $x=3$. Reduce your answer to simplest terms. Show your steps.

(b) If a student entered the following expression into their calculator, it would give them the incorrect answer. Why?

$$4(3)+3/3\text{^}3-7$$

Expressions can contain more complex operators, such as square and cube roots as well as absolute value. We will need each of these over the span of this course, so some practice with all of them is warranted.

***Exercise* #3:** Is the absolute value expression $|x-8|+2$ equivalent to $|x|+10$? How can you check this?

***Exercise* #4:** Consider the algebraic expression $\sqrt{25-x^2}$, which contains a square root.

(a) Evaluate this expression for $x=-3$.

(b) Why can you *not* evaluate the expression for $x=13$?

(c) Max thinks that the square root operation distributes over the subtraction. In other words, he believes the following equation is an identity:

$$\sqrt{25-x^2}=5-x$$

Show that this is **not** an **identity**.

Algebraic expressions can become quite complicated, but if you consider **order of operations** and work generally from **inside to outside** then you can evaluate any expression for replacement values.

***Exercise* #5:** Consider the rather complicated expression $\sqrt{\dfrac{|x-8|}{5x^2+4}}$.

(a) What operation comes last in this expression?

(b) Evaluate the expression for $x=2$. Simplify it completely.

***Exercise* #6:** Which of the following is the value of $\dfrac{\left|\sqrt{4x+9}-x^2\right|}{3}$ when $x=10$?

(1) 31

(3) 18

(2) 24

(4) 84

____

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COMMON ALGEBRAIC EXPRESSIONS
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Which of the following expressions has the greatest value when $x=5$? Show how you arrived at your choice.

$2x^2+7$ $\qquad$ $\dfrac{x^3-5}{3}$ $\qquad$ $\dfrac{10x-2}{x-3}$

2. A **zero** of an expression is a value of the input variable that results in the expression having a value of zero (catchy and appropriate name). Is $x=3$ a zero of the **quadratic expression** shown below? Justify your yes/no answer.

$$4x^2-8x-12$$

3. Which of the following is the value of the **rational expression** $\dfrac{2-3x^2}{6x+4}$ when $x=-2$?

(1) $-2\frac{1}{2}$ (3) $1\frac{1}{4}$

(2) $-\dfrac{5}{8}$ (4) $\dfrac{2}{7}$

____

4. If $x=5$ and $y=-2$ then $\dfrac{x+y}{x^2-y^2}$ is

(1) $\dfrac{1}{7}$ (3) $\dfrac{3}{29}$

(2) $\dfrac{13}{3}$ (4) $\dfrac{7}{19}$

____

5. What is the value of $\left||x-10|-|x+3|\right|$ if $x=2$?

(1) 7 (3) 3

(2) 5 (4) 17

6. If $x=2$ then $\frac{\sqrt{4x^2+2x+5}}{10}$ has a value of

(1) $\frac{5}{2}$ (3) $\frac{2}{5}$

(2) $\frac{7}{5}$ (4) $\frac{1}{2}$

APPLICATIONS

7. The revenue, in dollars, that eMathInstruction makes off its videos in a given day depends on how many views they receive. If *x* represents the number of views, in hundreds, then the profit can be found with the expression:

$$\frac{1}{2}x^2+6x-10$$

How much revenue would they make if their videos were viewed 600 times?

REASONING

8. Sameer believes that the two expressions below are equivalent. Test values and see if you can build evidence for or against this belief.

$(x-3)(x+8)$ $x^2+5x-24$

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BASIC EXPONENT PROPERTIES
COMMON CORE ALGEBRA II

Exponents, at their most basic, represent **repeated multiplication**. The way they combine, or don't combine, is dictated by this simple premise.

***Exercise* #1:** The following four steps are given to find the product of the **monomials** $-2x^5$ and $4x^2$.

$\left(-2x^5\right)\cdot\left(4x^2\right)$

(1) $-2\cdot\left(x^5\cdot 4\right)\cdot x^2$ _________________________

(2) $-2\cdot\left(4\cdot x^5\right)\cdot x^2$ _________________________

(3) $\left(-2\cdot 4\right)\cdot\left(x^5\cdot x^2\right)$ _________________________

(4) $-8x^7$

(a) For steps (1) through (3), write the real number property that justifies each manipulation.

(b) Explain why the final exponent on the variable x is 7.

Students (and teachers) can forget the basic properties used in simplifying the product of two monomials because we tend to pick up on the pattern of **multiplying the numerical coefficients** and **adding the powers** without thinking about the commutative and associative properties that justify our manipulations.

***Exercise* #2:** Find the product of each of the following monomials.

(a) $\left(5x^2\right)\left(3x^6\right)$ (b) $\left(-2x\right)\left(-6x^4\right)$ (c) $\left(\frac{3}{2}x^4\right)\left(6x^{10}\right)$ (d) $\left(4x^3\right)^2$

Remember, monomials (or terms) can have more than one variable, just as long as they are all combined using multiplication and division only. Multiplying monomials that contain more than one variable still just involves application of exponent laws and repeated use of the associative and commutative properties.

***Exercise* #3:** Find each of the following products, which involve monomials of multiple variables. Carefully consider what you are doing before applying patterns.

(a) $\left(4x^3y^2\right)\left(5xy^5\right)$ (b) $\left(-2x^7y^3\right)\left(-4x^2y^6\right)$ (c) $\left(\frac{1}{2}xy\right)\left(\frac{5}{2}x^2y^5\right)$

One of the key skills we will need this year will be factoring expressions, especially factoring out a common factor. To build some skills with this, consider the following problem.

***Exercise* #4:** Fill in the missing blank in each of the following equations involving a product such that the equation is then an identity.

(a) $6x^5 = (2x^2)(\_\_\_\_\_\_)$ (b) $12x^8 = (4x^3)(\_\_\_\_\_\_)$ (c) $20x^2y^4 = (-2xy^3)(\_\_\_\_\_\_\_\_\_)$

The final skill we will review in this lesson is using the **distributive property** of **multiplication (and division)** over **addition (and subtraction).**

***Exercise* #5:** Use the distributive property to multiply the following monomials and polynomials.

(a) $2x(5x+3)$ (b) $5x^3(2x^2-3x+6)$ (c) $-7x^2(x^2-2x+3)$

(d) $xy^2(x^2-y^2)$ (e) $3x^2y^4(2x^2y+xy^2-4y^3)$

Now, to build our way up to **factoring** in later units, let's make sure we can fill in missing portions of products.

***Exercise* #6:** Similar to Exercise #4, fill in the missing portion of each product so that the equation is an identity.

(a) $8x^2-12x=4x(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)$ (b) $7x^4-21x^3-28x^2=7x^2(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)$

(c) $10x^3y^2-20x^2y^3+35xy^5=5xy^2(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)$

(d) $4x^2(x-2)-9(x-2)=(x-2)(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)$

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BASIC EXPONENT PROPERTIES
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. The steps in finding the product of $\left(3x^2y^5\right)$ and $\left(7x^5y^2\right)$ are shown below. Fill in either the associative property or the commutative property to justify each step.

$\left(3x^2y^4\right)\left(7x^5y^2\right)$

$\left(3x^2\right)\left(y^4\cdot 7\right)\left(x^5y^2\right)$ ______________________________

$\left(3x^2\right)\left(7y^4\right)\left(x^5y^2\right)$ ______________________________

$3\left(x^2\cdot 7\right)\left(y^4x^5y^2\right)$ ______________________________

$3\left(7x^2\right)\left(x^5y^4y^2\right)$ ______________________________

$(3\cdot 7)\left(x^2x^5\right)\left(y^4y^2\right)$ ______________________________

$21x^7y^6$

2. Find each of the following products of monomials.

(a) $\left(3x^2\right)\left(10x^4\right)$ (b) $\left(-2x^5\right)\left(-9x\right)$ (c) $\left(4x^2y\right)\left(8x^5y^3\right)$ (d) $\left(5x^4\right)^2$

(e) $\left(-4t^2\right)\left(-15t^5\right)$ (f) $\left(7x\right)\left(5xy^4\right)$ (g) $\left(\dfrac{2}{3}x^4\right)(12x)$ (h) $\left(2x^2\right)\left(5x\right)\left(-6x^4\right)$

3. Fill in the missing portion of each product to make the equation an identity.

(a) $18x^6=3x^2$(________) (b) $40x^2y^7=8xy^2$(________) (c) $90x^4y=15xy$(__________)

(d) $24x^6=-3x^2$(________) (e) $-48x^4y^{10}=-16x^2y^2$(_______) (f) $49x^8y^6=7x^4y^3$(________)

4. Use the distributive property to write each of the following products as polynomials.

(a) $4x(5x+2)$ (b) $-5x(10-x)$ (c) $6x(x^2-4x+8)$

(d) $-10x^2(2x^2+x-8)$ (e) $7xy^3(2x^2y-5y^5)$ (f) $8x^2y^2(x^3-2x^2y+5xy^2-y^3)$

(g) $-7x^3(4x^2+2x-1)$ (h) $-16t(2t^2-2t+3)$ (i) $12xy(x^2-2xy+y^2)$

5. Fill in the missing part of each product in order to make the equation into an identity.

(a) $10x^5-35x^3=5x^3($____________$)$ (b) $-8x^3y+2x^2y^2-10xy^3=-2xy($________________$)$

(c) $-18t^2+45t^5=-9t^2($_______________$)$ (d) $45x^4-30x^2+15x^2=15x^2($___________________$)$

(e) $x(x+5)+6(x+5)=(x+5)($__________$)$ (f) $x^2(x-3)-(x-3)=(x-3)($______________$)$

REASONING

Another very important exponent property occurs when we have a monomial with an exponent then raised to yet another power. See if you can come up with a general pattern.

6. Write each of the following out as extended products and then simplify. The first is done as an example.

(a) $(x^2)^3=x^2\cdot x^2\cdot x^2=x^6$ (b) $(x^3)^2=$

(c) $(x^5)^4=$ (d) $(x^4)^3=$

7. So, what is the pattern? For positive integers *a* and *b*: $(x^a)^b=$ __________?

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MULTIPLYING POLYNOMIALS
COMMON CORE ALGEBRA II

Polynomials are expressions that are mainly combinations of terms in with both addition and subtraction that can have only constants and positive integer powers. They are truly just an extension of our base-10 number system.

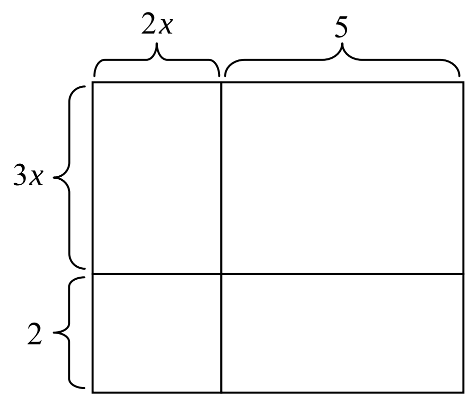
***Exercise* #1:** Given the polynomial $2x^3+5x^2+3x+4$, what is its value when $x=10$? How can you determine this without the use of your calculator? If you cannot, use your calculator to help and then explain why the answer turns out as it does.

We've already reviewed how to multiply polynomials by monomials in the last lesson. In this lesson we will look at multiplying polynomials by themselves. The key here is the distributive property. Let's start by looking at the product of **binomials**.

***Exercise* #2:** Consider the product of $(3x+2)$ with $(2x+5)$.

(a) Find this product using the distributive property twice (or possibly "foiling.")

(b) Represent this product on the area model shown below.



***Exercise* #3:** Find the product of the binomial $(4x+3)$ with the trinomial $(2x^2-5x-3)$. Represent your product using an area array. Even though the result has an x^3 term, the area array can still help us keep track of the product to make sure we are distributing correctly.

It is critical to understand that when we multiply two polynomials then our result is equivalent to this product and this equivalence can be tested.

***Exercise* #4:** Consider the product of $(x-2)$ and $(2x-5)$.

(a) Evaluate this product for $x=4$. Show the work that leads to your result.

(b) Find a trinomial that represents the product of these two binomials.

(c) Evaluate the trinomial for $x=4$. Is it equivalent to the answer you found in (a)?

(d) What is the value of the trinomial when $x=2$? Can you explain why this makes sense based on the two binomials?

***Exercise* #5:** The product of three binomials, just like the product of two, can be found with repeated applications of the distributive property.

(a) Find the product: $(x-2)(x+4)(x-7)$. Use area arrays to help keep track of the product.

(b) For what three values of *x* will the **cubic polynomial** that you found in part (a) have a value of zero? What famous law is this known as?

(c) Test one of the three values you found in (b) to verify that it is a **zero** of the **cubic polynomial**.

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MULTIPLYING POLYNOMIALS
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Multiply the following binomials and express each product as an equivalent trinomial. Use an area model to help find your product, if necessary.

(a) $(x+5)(x+8)$ (b) $(3x+2)(2x-7)$ (c) $(5x-2)(2x-3)$

(d) $(x^2-4)(x^2+10)$ (e) $(2x^3+1)(5x^3+4)$ (f) $(x^2-1)(x^2-9)$

2. Find each of the following products in equivalent form. Use an array model to help find your final answers if you find it helpful.

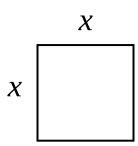
(a) $(x+5)(x^2+3x+2)$ (b) $(2x-3)(4x^2+5x-7)$

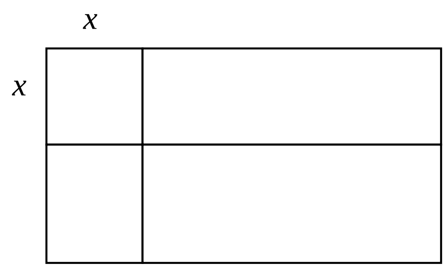
(c) $(2x+5)^3$

APPLICATIONS

3. A square of an unknown side length x inches has one side length increased by 4 inches and the other increased by 7 inches.

   (a) If the original square is shown below with side lengths marked as x, label the second diagram to represent the new rectangle constructed by increasing the sides as described above.





   (b) Label each portion of the second diagram with their areas in terms of x (when applicable). State the product of $(x+4)$ and $(x+7)$ as a trinomial below.

   (c) If the original square had a side length of $x=2$ inches, then what is the area of the second rectangle? Show how you arrived at your answer.

   (d) Verify that the trinomial you found in part (b) has the same value as (c) for $x=2$.

REASONING

4. Expression $(x-8)(x+4)$.

   (a) For what values of x will this expression be equal to zero? Show how you arrived at your answer.

   (b) Write this product as an equivalent trinomial.

   (c) Show that this trinomial is also equal to zero at the larger value of x from part (a).

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USING TABLES ON YOUR CALCULATOR
COMMON CORE ALGEBRA II

The graphing calculator is an amazing device that can do many things. One function that it is particularly good at is evaluating expressions for different input values. We will be looking at two tools on the calculator today, the **STORE** feature and **TABLES**. First let's look at how to use **STORE**.

***Exercise* #1:** Find the value of each of the following expressions by using the **STORE** feature on your calculator.

(a) x^2-2x+7 for $x=5$

(b) $\dfrac{2x+6}{3x-5}$ for $x=-10$

(c) $|7x-20|+x^2$ for $x=2$

Sometimes, the calculator can even tell us useful information even when it has a hard time evaluating an expression.

***Exercise* #2:** Consider the expression $\sqrt{6-2x}$. What happens when you try to use **STORE** to evaluate this expression for $x=5$? Evaluate the expression by hand to help explain what the calculator is trying to tell us.

***Exercise* #3:** Let's work with the product of two binomials again, specifically $(3x+2)$ and $(x+5)$.

(a) Find their product in trinomial form.

(b) Evaluate both the trinomial and the original product for $x=-2$. What do you notice?

(c) Use the **STORE** command to evaluate the trinomial from (a) for $x=-5$. Why does the value of the trinomial turn out to be this specific value at $x=-5$? Explain.

The **STORE** feature is extremely helpful when you are trying to determine the value of an expression at one or two input values of *x*. But, if you want to know an expression's values for multiple input values, then **TABLES** are a much better tool.

***Exercise* #4:** The expression $x^3+2x^2-16x-32$ has an **integer zero** somewhere on the interval $0 \le x \le 10$. Use a **TABLE** to find the **zero** on this interval. Show the table.

Table commands can be particularly good at establishing proof that two expression are equivalent. This is particularly helpful when you've done a number of manipulations and you want to have confidence that you've produced an algebraically equivalent expression.

***Exercise* #5:** Consider the more complex algebraic expression shown below:

$$(x+5)(x+8)-(x+3)(x-2)$$

(a) This relatively complex expression simplifies into a linear binomial expression. Determine this expression carefully. Show your work below.

(b) Set up a table using the original expression and the one you found in (a) over the interval $0 \le x \le 5$. Compare values to determine if you correctly simplifies the original expression.

x	y_1	y_2
0		
1		
2		
3		
4		
5		

Name: ____________________________________ Date: __________________

USING TABLES ON YOUR CALCULATOR
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Use the **STORE** feature on your calculator to evaluate each of the following. No work needs to be shown.

(a) $7x+18$ for $x=-8$

(b) $3x^2-2x+5$ for $x=3$

(c) $x^3+5x^2-4x-20$ for $x=-5$

(d) $\left|x^2-2x-8\right|$ for $x=1$

(e) $\dfrac{5x-3}{4x^2+5}$ for $x=2$

(f) $\sqrt{\dfrac{4-x}{x+9}}$ for $x=-5$

2. The **STORE** features is particularly helpful in checking to see if a value is a solution to an equation. Let's see how this works in this problem. Consider the relatively easy linear equation:

$$6x-3=4x+9$$

(a) Solve this equation for *x*.

(b) Using **STORE** ,determine the value of both the left hand expression, $6x-3$, and the right hand expression, $4x+9$, at the value of *x* you found in (a).

(c) Why does what you found in part (b) verify that your solution is correct (or possibly incorrect if you made a mistake in (a))?

3. Two of the following values of *x* are solutions to the equation: $x^2+4x-12=10x+4$. Determine which they are and provide a justification for your answer.

$x=-2$ $x=-5$ $x=6$ $x=8$

4. The quadratic expression $x^2 - 8x + 10$ has its smallest value for some integer value of x on the interval $0 \le x \le 10$. Set up a **TABLE** to find the smallest value of the expression and the value of x that gives this value. Show your table below.

5. Consider the complex expression $(x+7)(x+3)+(x-1)(x-4)$.

   (a) Multiply the two sets of binomials and combine like terms in order to write this expression as an equivalent trinomial in standard form. Show your work.

   (b) Set up a **TABLE** to verify that your answer in part (a) is equivalent to the original expression. Don't hesitate to point out that it is not equivalent (which means you either made a mistake in your algebra or in your table set up). Show your table.

6. The product of three binomials is shown below. Write this product as a polynomial in standard form. (Its highest power will be x^3).

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

7. Set up a table for the answer you found in #6 on the interval $-5 \le x \le 5$. Where does this expression have **zeroes**?