**Algebra I Calculator Activities**

*First Nine Weeks SOL Objectives*

*Calculating Measures of Central Tendency*

*SOL A.17*

- Organize a set of data
- Calculate the mean, median, mode, and range of a set of data
- Describe the relationships between and among data sets
- Use the calculated values for mean, median, mode, range, and box-and-whisker plots to compare and contrast two sets of data.

**CALCULATOR ACTIVITY**

**Step 1:** STAT, ENTER, enter data in list, 2nd MODE

**Step 2:** 2nd, STAT → math, select measure of central tendency, 2nd, #1, ENTER (when open parenthesis appears behind the tendency, the calculator is asking where is the date in question located)

**EXAMPLE 1:** Find the mean, median, mode and range for each set of data. Round answers to nearest tenth when needed.

**NOTE:** To clear data out of a list, arrow to the top of the list where L1 is, press the CLEAR key then arrow down.

- a. 35, 55, 56, 40, 80, 90, 102, 80
- b. 2, 8, 3, 2, 7, 6, 10, 2, 3

**Additional Examples:** Luster’s Algebra I Workbook pp. 158-159.

**Creating Box-and-Whisker Plot Using TI-83**

*SOL A.17*

**Step 1:** STAT, ENTER, enter data in list

**Step 2:** 2nd, Y=, ENTER, select on, ENTER, arrow down once, then use the right arrow key to arrow to the middle graph on the second row, ENTER, ZOOM, #9

**Step 3:** TRACE, use arrow keys to move along the box-and-whisker plot

**EXAMPLE 1:** Use the date from above calculator activity
Algebra I Calculator Activities

Evaluating Expressions
SOL A.2

❖ Use algebraic expressions to describe mathematical relationships.
❖ Evaluate algebraic expressions for a given replacement set using order of operations.

CALCULATOR ACTIVITY

Step 1: Enter number to be substituted, STO, ALPHA, number of green colored letter, ENTER (repeat process for other numbers to be stored)
Step 2: Enter expression, ENTER (Enclosed all fractions in parenthesis)

Example: 1. Evaluate $3a - 4b + 3$; when $a = 1/3$, $b = -1/2$
2. Evaluate $-5x + 6y - 7z$; when $x = -2$, $y = -5$, and $z = -3$.

Operations on Matrices
SOL A.4

❖ Use matrices to organize data arising from applications in business, industry, and consumerism.
❖ Add and subtract matrices
❖ Multiply a matrix by a scalar factor

CALCULATOR ACTIVITY

Step 1: MATRIX, edit, ENTER, change dimensions of matrix, ENTER, enter data (after each entry press the ENTER key)

Step 2: MATRIX, edit, arrow down to matrix B, ENTER, change dimensions of matrix, ENTER, enter data, 2nd MODE

Step 3: MATRIX, select matrix, ENTER, select math operation to be performed, MATRIX, select matrix, ENTER, ENTER

Additional examples: See Luster’s Workbook, pp. 149-150
Algebra I Calculator Activities

CONFIRMING SOLUTIONS TO LINEAR EQUATIONS
SOL A.1
- Confirm algebraic solutions to equations using the functions of a graphing calculator.
- In an implicit equation, graph each side of the equation separately but on the same set of axes and find the coordinates of the point of intersection.
- In an explicit equation, graph the equation and find the x-intercept.
- Solve literal equations (formulas) and implicit equation for a specified variable.

CALCULATOR ACTIVITY

Step 1: \( Y = \), enter left side of equation in \( Y_1 \), enter right side of equation in \( Y_2 \), GRAPH

NOTE: The window of the calculator may need to be adjusted to fit the graph.

Step 2: 2nd, TRACE, #5, ENTER, ENTER, ENTER (Look for the word “Intersection” at the bottom left corner of screen)

NOTE: a. The x-? is the correct solution, if the two lines intersect
   b. If the two lines are parallel (do not intersect), there are no solutions
   c. If there is only one line on the graph, then the solution is “Identity” (many solutions or infinite solutions)

Examples:
1. What is the solution to \( 3(2a + 25) - 2(a-1) = 78? \)
2. What is the zero of the function, \( 3y + 2(y - 4) - 5y + 25 \)
3. What is the solution to \(-4(x + 3) = 2x - 6(x + 2)\)

Additional Examples: Luster’s Workbook p. 79
Second Nine Weeks SOL Objectives
Finding Range, Given the Domain
SOL A.15

- Identify the domain and range for a linear relation when given a set of ordered pairs, a table, a mapping, or a graph.
- Compare and contrast relations and functions.

CALCULATOR ACTIVITY

**Step 1:** \( Y=\), enter function, \( 2^{\text{nd}} \) \text{GRAPH}, look under the x until you find the given domain, then find the corresponding y value.

Examples:
1. What is the range for \( y = -2x - 3 \), given domain \{-4, 0, 5\}
2. What is the range for \( y = 50x + 90 \), given domain \{-30, 20, 40\}

Additional Examples: Luster’s Workbook p. 59

CONFIRMING SOLUTIONS TO INEQUALITIES
SOL A.1

- Solve linear inequalities in one variable.
- Graph the solution to a linear inequality in the coordinate plane.

CALCULATOR ACTIVITY

**Step 1:** \( Y=\), enter entire inequality in \( Y1 \)
(To get the inequality symbol: \( 2^{\text{nd}} \), \text{MATH}, select inequality symbol, \text{ENTER})

**Step 2:** \text{ZOOM}, \#6, \text{TRACE}, use arrow keys to slowly move the cursor until it jumps up or down. Then look for the x value at bottom of screen.

**NOTE:**
- If the graph is shaded to the right, the inequality is \( > \) or \( \geq \)
- If the graph is shaded to the left, the inequality symbol is \( < \) or \( \leq \).

Examples:
1. What is the solution set for, \(-3x + 6 < 15\)?
2. What is the solution set for \(4 \geq 4x + 24\)?
3. What is the solution set for \(4x + 1 < -3x - 5\)?
Algebra I Calculator Activities

**Graphing a Linear Equation**

**SOL A.6**

- Using the line \( y = x \) as a reference, generalize the effect of changes in the equation on the graph of the line. Use the graphing calculator to facilitate development of this concept.
- Given the equation of a line, solve for the dependent variable and graph:
  a. using transformations
  b. using the slope and y-intercept
  c. using the x-intercept and y-intercept

**CALCULATOR ACTIVITY**

**Step 1:** Equation must be in \( y = mx + b \) form  
**Step 2:** \( Y = \), enter equation, zoom #6

**Examples:** Describe the changes in the graphs using transformation

1. From \( y = x \) to \( y = x + 5 \)
2. From \( y = x \) to \( y = 3x \)
3. From \( y = x \) to \( y = -x - 4 \)

**Graphing Inequalities in Two Variables**

**SOL A.6**

- Graph an inequality in two variables.

**CALCULATOR ACTIVITY**

**Step 1:** Solve inequality for \( y \)  
**Step 2:** \( Y=\), enter inequality, arrow over to line in front of \( Y_1 \), press ENTER until there is a triangle pointing downward for \(<\), and a triangle pointing upward for \(>\), ZOOM #6

**Examples:** Luster’s Workbook, pp. 94-100.

**Determining Slopes from Two Points:** A.7  
**Writing Equations, Given Two Point:** A.8

**A.7**

- Recognize that \( m \) represents the slope in the equation of the form \( y = mx + b \)
- Calculate the slope of a line given the coordinates of two points on the line
- Compare the slopes of graphs of linear functions, using the graphing calculator.
Algebra I Calculator Activities

A.8

- Recognize that equations of the form \( y = mx + b \) and \( Ax + By = C \) are equations of lines.
- Write the equation of the line when given the graph of a line.
- Write an equation of the line when given two points on the line whose coordinates are integers.
- Write an equation of a vertical line as \( x = c \).
- Write an equation of a horizontal line as \( y = c \).

**CALCULATOR ACTIVITY**

**Step 1:** STAT, ENTER, enter x value in \( L_1 \) and y value in \( L_2 \)

**Step 2:** STAT, CALC, #4, VARS, y-vars, ENTER, ENTER, ENTER

**Step 3:** Substitute the value of \( a \) and \( b \) into equation

**Additional Examples:** Luster’s Workbook, pp. 110 – 111
Algebra I Calculator Activities

Third Nine Weeks SOL Objectives
Scatter Plots and Equations of Lines
SOL A.16

- Write an equation for the line of best fit, given a set of six to ten data points in a table, on a given graph, or from a practical situation.

- Make predictions about unknown outcomes, using the equation of a line of best fit.

CALCULATOR ACTIVITY

Step 1: STAT, ENTER, enter data in L1 and L2

Step 2: 2nd, Y=, ENTER, arrow to on ENTER, arrow down once, ENTER, ZOOM, #9

Step 3: STAT, CALC, #3, 2nd #1, COMMA KEY, 2nd, #2, COMMA KEY, VARS, y-vars, ENTER, ENTER, ENTER, GRAPH

Examples: Luster’s Workbook, p. 154 – 155.

Solve Systems of Equations
SOL A.9

- Determine whether a system of two line equations has one solution, no solution, or infinite solutions.

- Given a system of two linear equations in two variables that has a unique solution, solve the system graphically to find the point of intersection.

CALCULATOR ACTIVITY

Step 1: Equations must be in y = mx + b form
Step 2: Y=, enter equations in Y1 and Y2, GRAPH
Step 3: 2nd, TRACE, #5, ENTER, ENTER, ENTER
Step 4: If the lines intersect, look for solution at bottom of screen, write the answers as an ordered pair.

NOTES:

1. Observe the graph on the calculator screen:
   a. If the two lines intersect, there is only one solution. Continue with step 3 of solving systems in Y=.
   b. If the two lines do not intersect, the answer to the system is “no solution”.
   c. If there is only one line on the graph, then the answer to the system is “infinite solutions”
Algebra I Calculator Activities

Examples: Solve each system by graphing in Y=
1.  \[ y = 4x + 1 \]
   \[ 2x + y = 4 \]
2.  \[ x = -3y + 3 \]
   \[ 4x + 6y = 12 \]
3.  \[ 6x + 3y = -6 \]
   \[ 2x + y = -2 \]

Solve Systems of Equations Using Matrices
SOL A.9

❖ Solve systems of equations using matrix manipulation

CALCULATOR ACTIVITY

Step 1: MATRIX, edit, ENTER, change dimensions of matrix, ENTER

Step 2: Enter data by rows. After each entry press ENTER.

Step 3: MATRIX, edit, arrow to B, ENTER, enter data, 2\textsuperscript{nd}, MODE

Step 4: MATRIX, SELECT [A], ENTER, \( x^{-1} \), MATRIX, select [B], ENTER, ENTER

Examples: 1. What is the solution to the following systems:

A. \[ 2x + 3y = 9 \]
   \[ -4x - 6y = -12 \]
B. \[ y = -3/4x + 1 \]
   \[ 3x + 4y = 10 \]

Additional examples: Luster’s Workbook, pp. 128 – 129.
Algebra I Calculator Activities

Operations with Polynomials
SOL A.11

- Add, subtract, and multiply polynomials and divide polynomials with monomials, divisors, using concrete objects, pictorial and area representations, and algebraic manipulations.

CALCULATOR ACTIVITY

Step 1: Y=, enter the problem in Y₁ and enter multiple choice answer Y₂.
Step 2: ZOOM, #6, or adjusted window.

NOTE: If the two graphs fit on top of each other, then the multiply choice answer is the correct answer.

Examples: Which is the simplified form of \((4x^2 + 3x + 15) + (3x^2 + x - 7)\)?

A. \(7x^4 + 4x + 8\)
B. \(7x^4 + 3x + 22\)
C. \(7x^2 + 4x + 8\)
D. \(7x^2 + 3x + 8\)

Additional examples: Luster’s Workbook p. 16
Algebra I Calculator Activities

Fourth Nine Weeks SOL Objectives
Factoring First & Second Degree Polynomials
SOL A.12

- Factor first and second degree polynomials completely

CALCULATOR ACTIVITY

Step 1: MATH, #0, enter polynomial, ALPHA, ENTER. Set X = 100, ALPHA, ENTER.
Step 2: Take the opposite of the value of x to include in the factor
Step 3: Set X= -100, ALPHA, ENTER. Repeat step 2.

NOTE: The answer must have a bullet in from of the X.

Examples: Factor completely

1. $6x^2 - 19x + 15$
2. $6x^2 - 7x - 5$
3. $4x^2 + 24x + 36$

Additional examples: Luster’s Workbook p. 29-30

Graphing & Solving Quadratic Equations
SOL A.14 & A.15

- A.14 Solve quadratic equations in one variable both algebraically and graphically. Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.

- A.15 Given a rule, find the values of a function for elements in its domain and locate the zeros of the function both algebraically and with a graphing calculator. The value of f(x) will be related to the ordinate on the graph.

CALCULATOR ACTIVITY

Finding the zeros of a quadratic equation

Step 1: Y=, enter quadratic, ZOOM, #6
Algebra I Calculator Activities

Step 2: 2\textsuperscript{nd}, TRACE, #2. The calculator will ask for left bound. Move the cursor to the left of the x-axis, Enter. The calculator will ask for right bound. Move the cursor to the right side of the x-axis, ENTER, ENTER.

Step 3: Repeat step 2 for the other side of the parabola

Examples: Find the zero’s of the function

1. \[2x^2 - 5x - 12 = 0\]
2. \[6a^2 - 2a - 15 = 0\]
3. \[2x^2 - 19x + 42 = 0\]

Additional examples: Luster’s Workbook, p. 138-139

Helpful Calculator Activity

True and False Method of Taking a Multiple Choice Test

Step 1: Enter any number in the calculator except zero or one, \texttt{STO, X} then ENTER

Step 2: Enter the problem, 2\textsuperscript{nd MATH}, select =, enter multiple choice answers, \texttt{ENTER}. If a zero appears the answer is false. If a one appears, it is a true statement.