Examining Linear Equations
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Materials:
- TI-Nspire™ (non-CAS)
- LinearEquationAlg1.tns
- LinearEquationAlg1.pdf
- TI-Nspire™ Software *(for editing)*

Level: Beginning Algebra 1

Classroom setup:
- Can be used as a teacher directed demonstration or lesson introduction.
- Can be used as a class activity with students working alone or in groups.

This activity is designed to allow beginning level algebra students to experience multiple representations for the concept of solving linear equations. Students should approach this activity knowing the process for solving simple linear equations algebraically. A certain degree of calculator knowledge is also assumed, such as maneuvering the calculator page, using the "grab" hand, graphing lines, and finding intersection points.

This activity uses the TI-Nspire (non-CAS) to examine linear equations algebraically, geometrically and graphically.
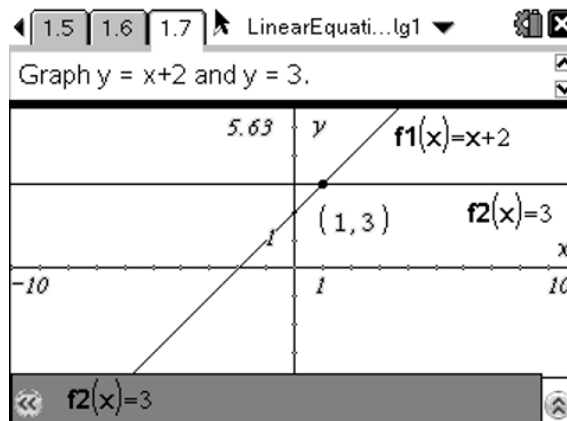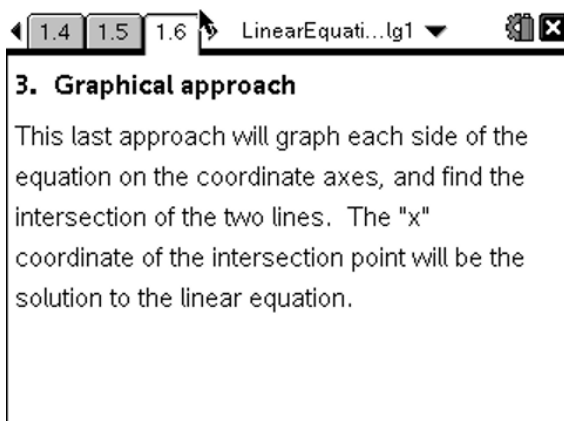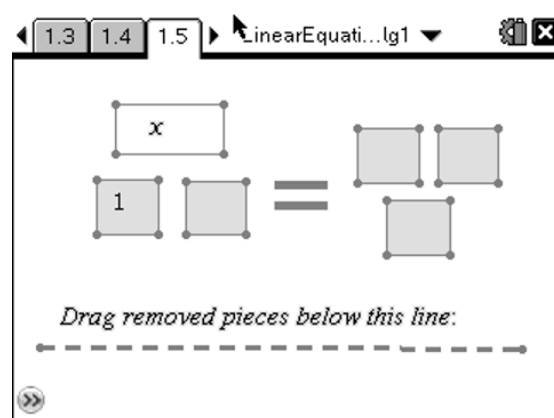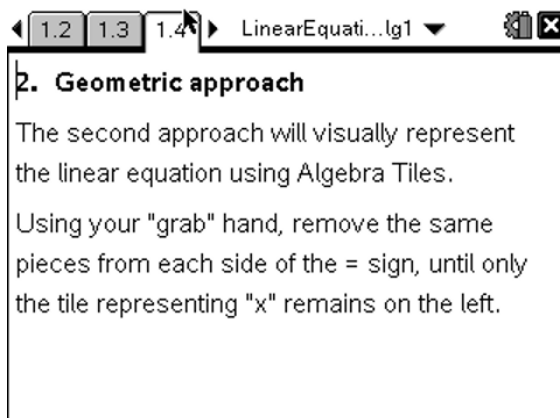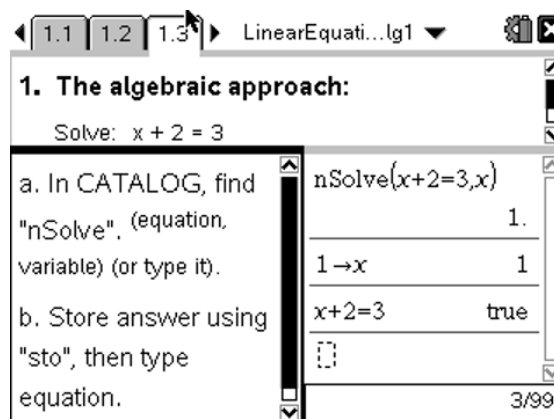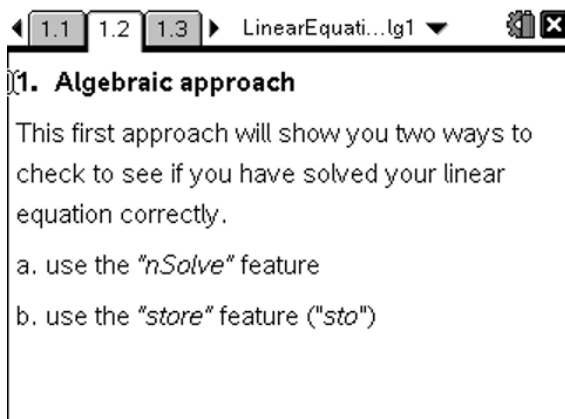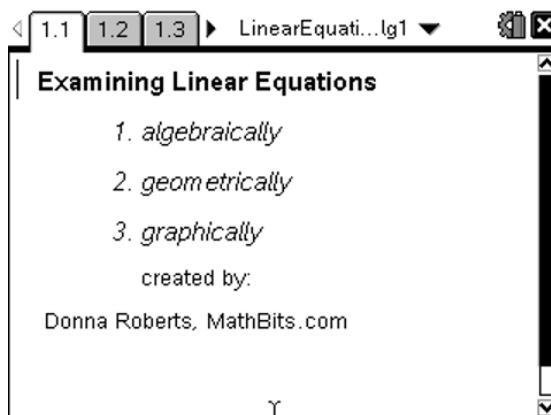
1. *Algebraically*: Students solve simple linear equations using a paper and pencil approach, but use the calculator to check or verify their work. The "nSolve" command is shown as a checking mechanism. In addition, the concept of storing the "answer" in the calculator and then checking the equation for a "true" or "false" reading is presented.

2. *Geometrically:* Students manipulate Algebra tiles as a visual verification that the solution to a linear equation is correct. Using the "grab" hand, students actually move the tile pieces to see the solution to the equation.

3. *Graphically:* Students graph the left and right hand sides of the equation separately on the coordinate axes. The point of intersection is found. The *x*-coordinate of the intersection point is the solution to the equation.

Note to teachers: The .tns file shows solutions to the algebraic and graphic sections of this activity, for the purpose of clarity of the activity. Using your handheld, or your TI-Nspire software, remove the solutions from these two sections, as the solutions should be completed by the students.

Practice problems are provided to reinforce these concepts of multiple representations. If your students need additional practice solving linear equations "by hand", have them solve the equations before starting the activity. The activity will then be used to "check" their work. Ask students to show their calculations to the class or ask groups to present solutions.

Screen shots:

FILE: LinearEquationAlg1.tns
LEVEL: Beginning Algebra 1
DEVICE: TI-Nspire (non-CAS)

◁ 1.1 | 1.2 | 1.3 ▶   LinearEquati...lg1 ▼

Examining Linear Equations

1. *algebraically*

2. *geometrically*

3. *graphically*

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◁ 1.1 | 1.2 | 1.3 ▶   LinearEquati...lg1 ▼

1. Algebraic approach

This first approach will show you two ways to check to see if you have solved your linear equation correctly.

a. use the *"nSolve"* feature

b. use the *"store"* feature ("*sto*")

◁ 1.1 | 1.2 | 1.3 ▶   LinearEquati...lg1 ▼

1. The algebraic approach:

Solve: x + 2 = 3

a. In CATALOG, find "nSolve". (equation, variable) (or type it).

b. Store answer using "sto", then type equation.

$\text{nSolve}(x+2=3,x)$ 1.

$1 \rightarrow x$ 1

$x+2=3$ true

3/99

◁ 1.2 | 1.3 | 1.4 ▶   LinearEquati...lg1 ▼

2. Geometric approach

The second approach will visually represent the linear equation using Algebra Tiles.

Using your "grab" hand, remove the same pieces from each side of the = sign, until only the tile representing "x" remains on the left.

◁ 1.3 | 1.4 | 1.5 ▶   LinearEquati...lg1 ▼

x

1

Drag removed pieces below this line:

◁ 1.4 | 1.5 | 1.6 ▶   LinearEquati...lg1 ▼

3. Graphical approach

This last approach will graph each side of the equation on the coordinate axes, and find the intersection of the two lines. The "x" coordinate of the intersection point will be the solution to the linear equation.

◁ 1.5 | 1.6 | 1.7 ▶   LinearEquati...lg1 ▼

Graph y = x+2 and y = 3.

5.63   y

$f1(x)=x+2$

$(1,3)$ $f2(x)=3$

x

−10   1   10

$f2(x)=3$

Examining Linear Equations

*Name*_____

Directions: Read carefully as to how you are to verify your solutions to these equations. Be ready to demonstrate your methods to the class.
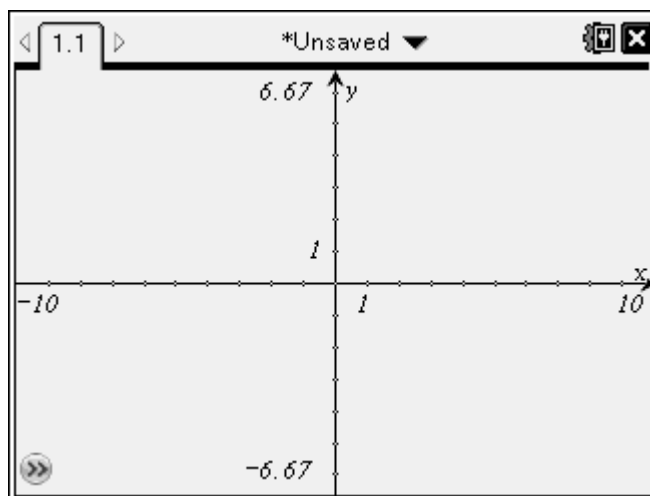
1. Solve for x: $2x + 4 = 10$. Using the "nSolve" command, verify your solution.

2. Solve for x: $4x - 8 = 12$. Using the "sto" method, verify your solution.

3. Solve for x: $x + 4 = 6$. Using Algebra tiles, draw a diagram illustrating this equation and its solution.

4. Solve for x: $3x + 5 = 4x - 3$. Using the graphical approach, verify your solution. Sketch the graph.

1.1	*Unsaved ▼	

6.67 ↑y

1

−10   1   10 x

−6.67

5. Solve for x: $4x + 1 = 2x + 6$. Choose a method (not Algebra tiles) to verify your solution.