TI-Nspire Standardized Test Prep compatible with the ACT

Page **Table of Contents**

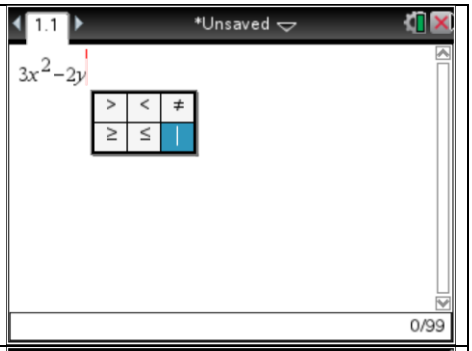
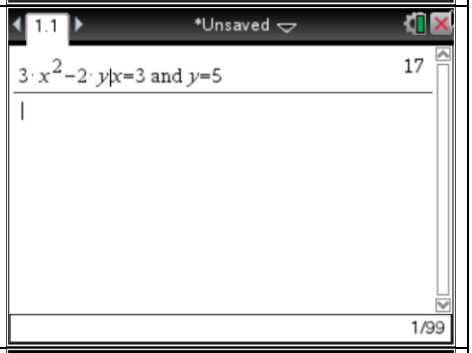
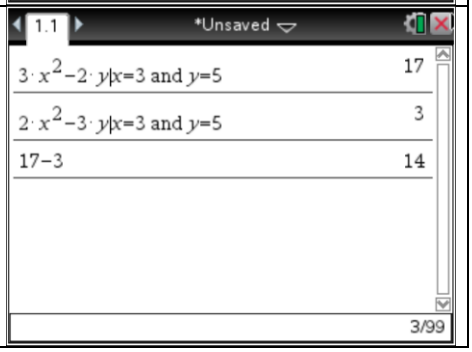
IMPORTANT: Make sure to update your TI-Nspire Operating System (OS). Update to at least level 3.2 for the steps in this document to work properly

Elementary Algebra - **Substitution**

Evaluation of algebraic expressions through substitution

When $x = 3$ and $y = 5$, by how much does the value of $3x^2 - 2y$ exceed the value of $2x^2 - 3y$?

F. 4 G. 14 H. 16 J. 20 K. 50

Type the first expression, $3x^2 - 2y$. Press ctrl = and choose the *such that* command (it looks like a vertical bar).	
Type **x=3 and y=5** then press enter. Press the ▲ arrow on the touchpad twice to highlight the expression you typed in.	
Press enter and edit the expression to read, $2x^2 - 3y$, then press enter. Subtract the value of the second expression from the value of the first expression.	

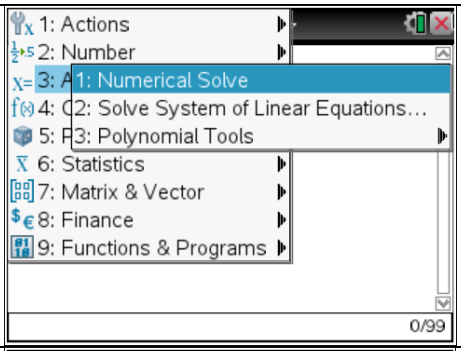
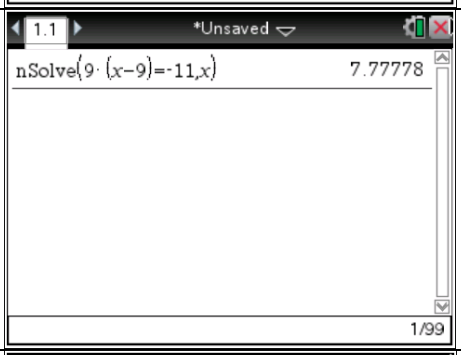
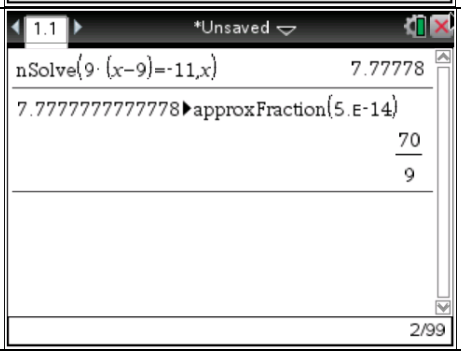
http://www.actstudent.org/sampletest/math/math_01.html

Pre-Algebra - **Solving Linear Equations**

Solving Linear Equations in one-variable

If $9(x-9)=-11$, then $x=?$

A. $\frac{-92}{9}$ B. $\frac{-20}{9}$ C. $\frac{-11}{9}$ D. $\frac{-2}{9}$ E. $\frac{70}{9}$

Press menu >Algebra>Numerical Solve.	
Then type the equation, $9(x-9)=-11$ Now, type , X and press enter.	
Press menu >Number>Approximate to Fraction, then press enter.	

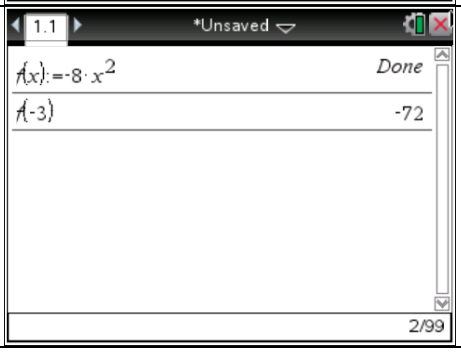
http://media.actstudent.org/documents/preparing.pdf

Intermediate Algebra - **Functions**

Evaluating a Function at a Value

A function $f(x)$ is defined as $f(x) = -8x^2$. What is $f(-3)$?

F. -72 G. 72 H. 192 J. -576 K. 576

Type $f(x)$, then press ctrl ▫▫ (this types :=)	
Then type the function, $-8x^2$ and press enter.	
Type $f(-3)$ and press enter.	

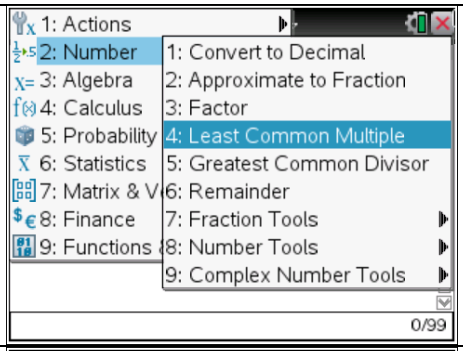
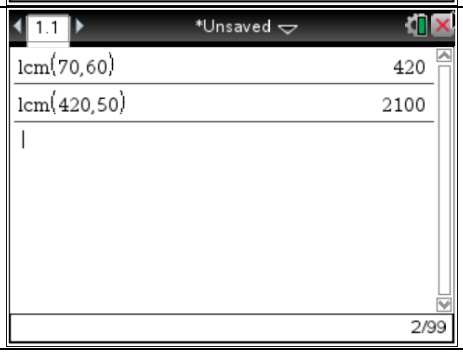
http://media.actstudent.org/documents/preparing.pdf

Pre-Algebra - **Lowest Common Multiple**

Basic Operations Using Whole Numbers

What is the least common multiple of 70, 60, and 50 ?

F. 60 G. 180 H. 210 J. 2,100 K. 210,000

Press menu >Number>Least Common Multiple.	
Then type 70,60 and press enter. Now, we are going to find the LCM of the answer you just calculated and the 3rd number.	
Press menu >Number>Least Common Multiple. Type 420,50 and press enter.	

http://media.actstudent.org/documents/preparing.pdf

Intermediate Algebra - **Modeling**

Find the function given a set of data

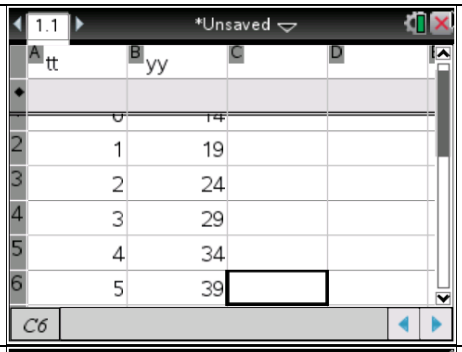
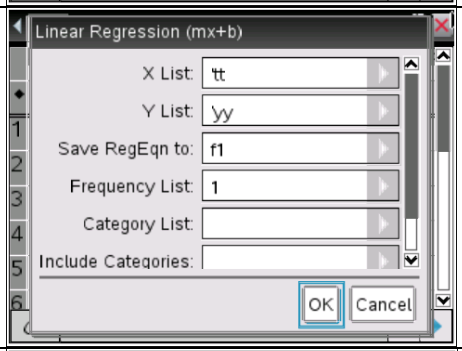
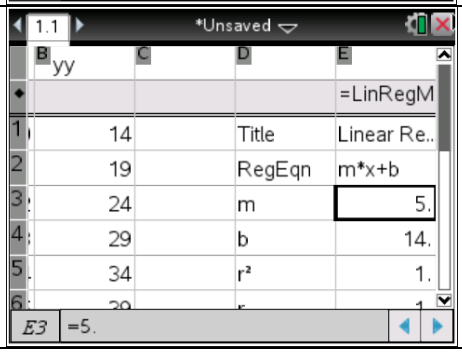
As Part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance, y feet, of the cart from a reference point at 1 −second intervals from $t = 0$ seconds to $t = 5$ seconds.

t	0	1	2	3	4	5
y	14	19	24	29	34	39

Which of the following equations represent this data?

F. $y = t + 14$ G. $y = 5t + 9$ H. $y = 5t + 14$

J. $y = 14t + 5$ K. $y = 19t$

Insert a **Lists & Spreadsheet** page. Title the lists (in the top cell) tt and yy. Type in the data. (Press tab to navigate to the next cell).	
Place your cursor in column C. Press menu >Statistics>Stat Calculations>Linear Regression (mx+b).	
Press enter to see the results of the regression.	

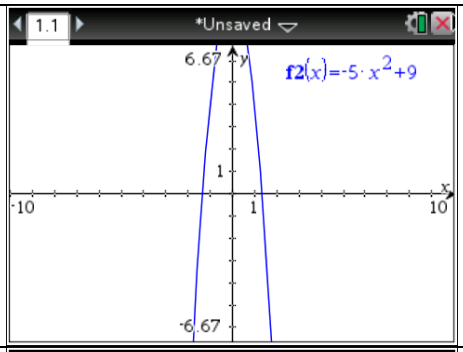
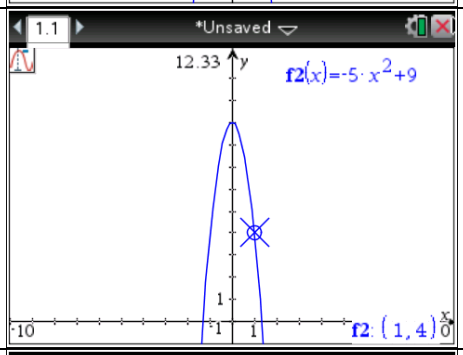
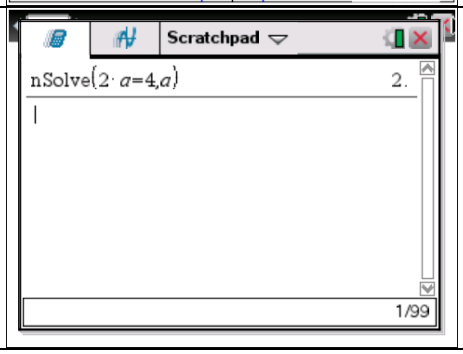
http://media.actstudent.org/documents/preparing.pdf

Coordinate Geometry - **Points**

Relations between equations and graphs

The graph of $y = -5x^2 + 9$ passes through $(1,2a)$ in the standard (x, y) coordinate plane. What is the value of a?

F. 2 G. 4 H. 7 J. -1 K. -8

Insert a **Graphs** page. Type $-5x^2 + 9$ and press enter.	
Press menu >Trace>Graph Trace. Type 1 and press enter. (This jumps the point to the x-value of 1)	
Solve $2a = 4$ (Hopefully, you don't need a calculator for this step).	

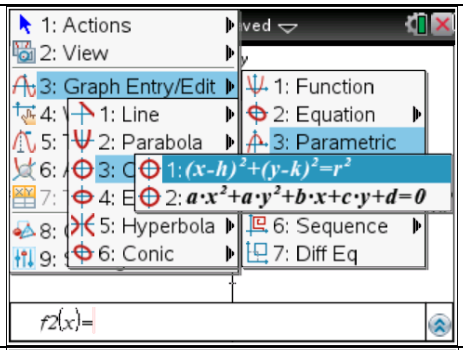
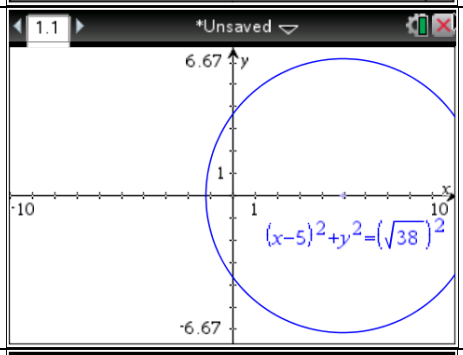
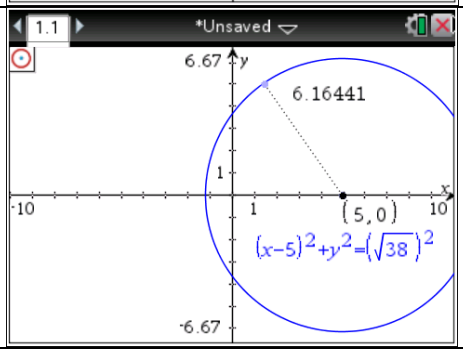
http://media.actstudent.org/documents/preparing.pdf

Coordinate Geometry - **Circles**

Relations between equations and graphs

A particular circle in the standard (x, y) coordinate plane has an equation of $(x-5)^2 + y^2 = 38$. What are the radius of the circle, in coordinate units, and the coordinates of the center of the circle?

	radius	**center**		**radius**	**center**
F.	$\sqrt{38}$	$(5,0)$	H.	38	$(5,0)$
G.	19	$(5,0)$	J.	$\sqrt{38}$	$(-5,0)$
			K.	19	$(-5,0)$

Insert a **Graphs** page. Press menu >Graph Entry/Edit>Equation>Circle> $(x-h)^2 + (y-k)^2 = r^2$	
Type 5 for h, 0 for k, and $\sqrt{38}$ for r. Press enter to graph the circle.	
Press menu >Analyze Graph>Analyze Conics>radius (Click once on the circle and again to place the measurement. Press menu >Analyze Graph>Analyze Conics>Center (click twice like before) Since 6.16441 is approximately $\sqrt{38}$, you have found the answer.	

http://media.actstudent.org/documents/preparing.pdf

Intermediate Algebra - **System of Equations**

Graphing a system of equations

The equations below are linear equations of a system where a, b, and c are positive integers. $ay + bx = c$

$ay - bx = c$

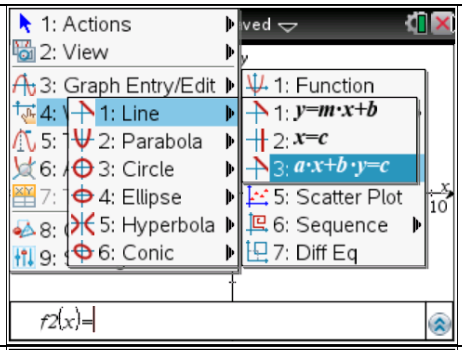
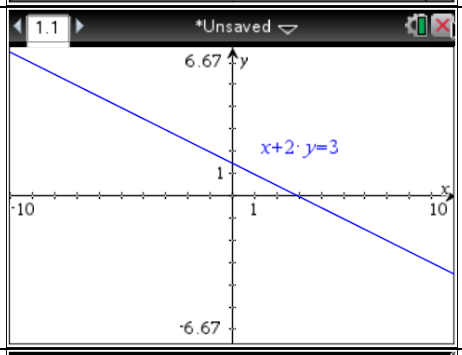
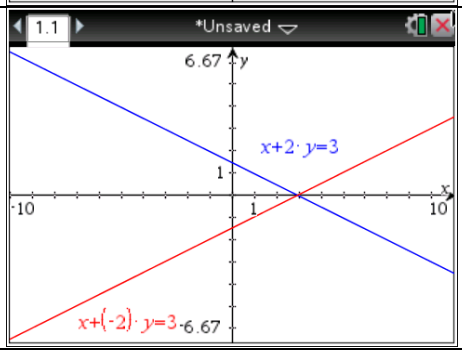
Which of the following describes the graph of at least 1 such system of equations in the standard (x, y) coordinate plane?

I. 2 parallel lines

II. 2 intersecting lines

III. A single line

A. I only B. II only C. III only D. I or II only E. I, II, or III

Choose values for a, b and c so that you can graph each equation. Let's set $a = 1$, $b = 2$ and $c = 3$ Press menu >Graph Entry/Edit>Equation>Line> $a \cdot x + b \cdot y = c$	
Type 1, 2 and 3 in the appropriate spots. Press enter to graph the line.	
Press tab to open the Entry Line. Type 1, −2 and 3 in the appropriate spots. Press enter to graph the line.	

http://media.actstudent.org/documents/preparing.pdf

Intermediate Algebra - **System of Equations**

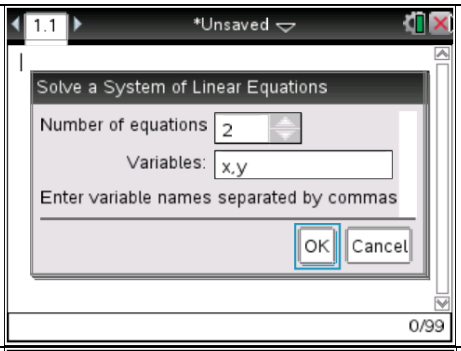
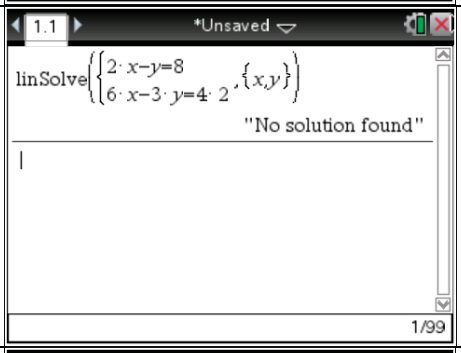
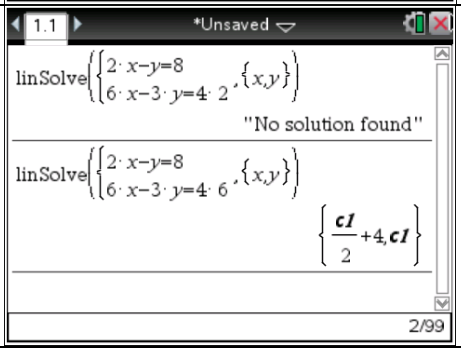
Solving a system of equations

For what value of a would the following system of equations have an infinite number of solutions?

$$2x - y = 8$$

$$6x - 3y = 4a$$

A. 2 B. 6 C. 8 D. 24 E. 32

Press menu >Algebra>Solve System of Equations Click **OK** since the default choices are correct.	
Type the first equation, $2x - y = 8$, then type the second equation and substitute the first answer choice for a, $6x - 3y = 4 \cdot 2$ Press enter to find the solution.	
Copy and paste the previous command by clicking ▲ on the Touchpad until the previous command is highlighted, press enter to paste the command. Now, edit the command so that the 2nd answer choice is substituted for a. (the ***c1*** indicates an infinite number of solutions)	

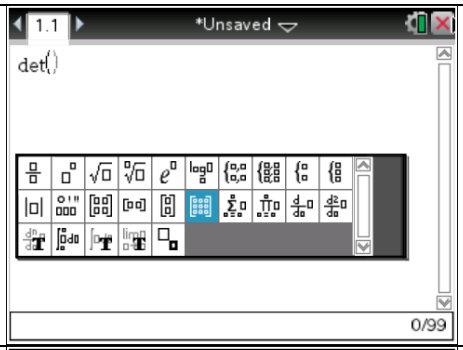
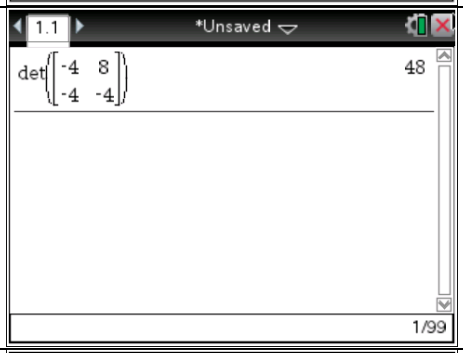
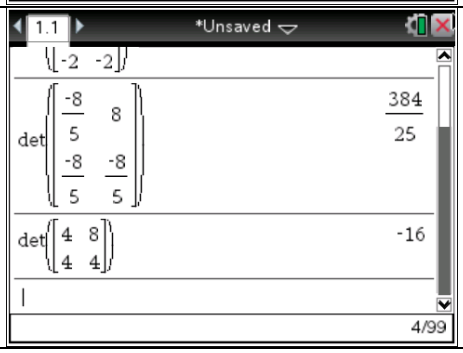
http://media.actstudent.org/documents/preparing.pdf

Intermediate Algebra - **Matrices**

Finding the Determinant of a Matrix

The determinant of a matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ equals $ad - cb$. What must be the value of x for the matrix $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$ to have a determinant of -16 ?

A. -4 B. -2 C. $\frac{-8}{5}$ D. $\frac{8}{3}$ E. 4

Press menu >Matrix & Vector>Determinant. Press [▪▪] and choose the 2×2 matrix shown.	
Substitute the first answer choice for x and type the matrix, $\begin{bmatrix} -4 & 8 \\ -4 & -4 \end{bmatrix}$ Press enter to find the determinant of the matrix.	
Copy and paste the previous command by clicking ▲ on the Touchpad until the previous command is highlighted, press enter to paste the command. Now, edit the command so that the 2nd answer choice is substituted for x. (Repeat with all the answer choices)	

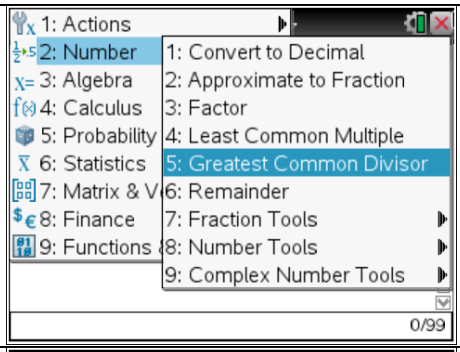
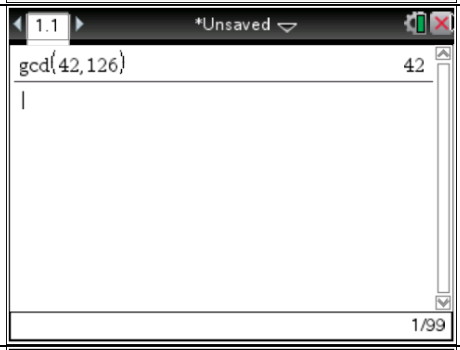
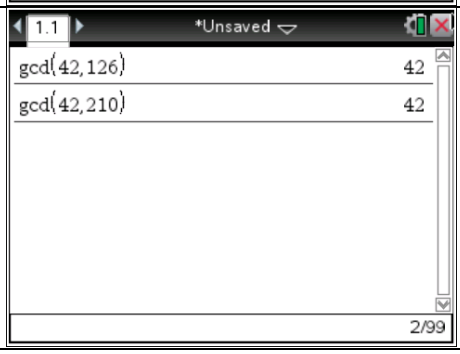
http://media.actstudent.org/documents/preparing.pdf

Pre-Algebra **- Greatest Common Factor**

Basic Operations Using Whole Numbers

What is the greatest common factor of 42,126 and 210 ?

F. 2 G. 6 H. 14 J. 21 K. 42

Press menu >Number>Greatest Common Divisor.	
Then type 42,126 and press enter. Now, we are going to find the GCF of the answer you just calculated and the 3rd number.	
Press menu >Number>Greatest Common Divisor. Type 42,210 and press enter.	

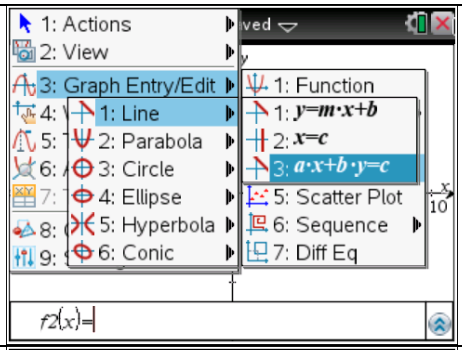
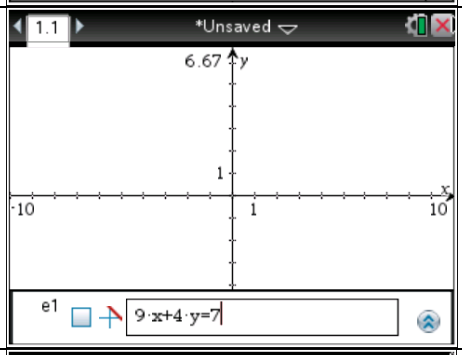
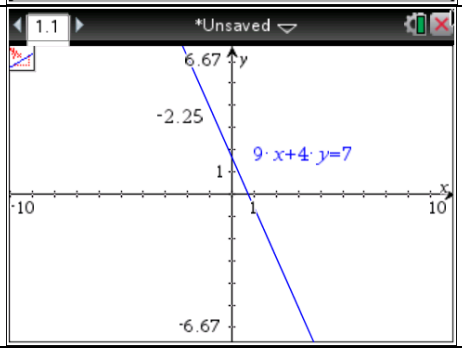
http://www.actstudent.org/sampletest/math/math_01.html

Coordinate Geometry - **Slope**

Finding the slope of a linear line

What is the slope of any line parallel to the line $9x + 4y = 7$?

F. -9 G. $\frac{-9}{4}$ H. $\frac{9}{7}$ J. 7 K. 9

Press menu >Graph Entry/Edit>Equation> Line>ax+by=c.	
Then type $9,4,7$ in the blanks. (Use the tab key to jump from one to the next). Press enter to graph the function.	
Press menu >Geometry>Measurement>Slope. Click once on the graph and click once more to place the slope measurement on the screen.	

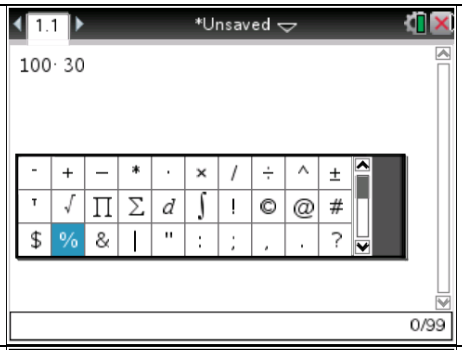
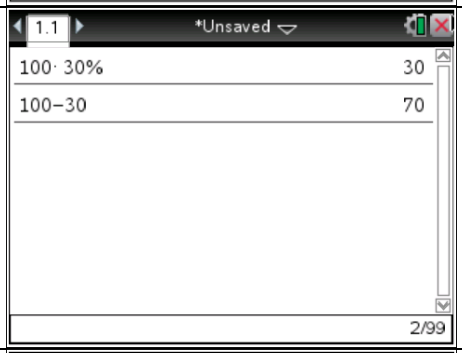
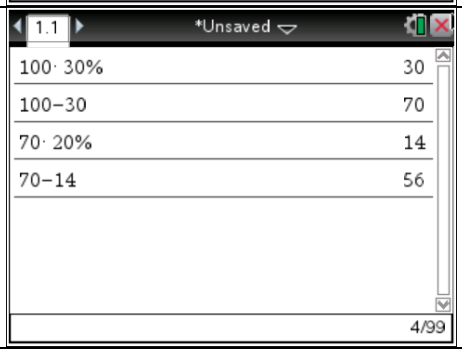
http://www.actstudent.org/sampletest/math/math_02.html

Pre-Algebra - **Percent**

Converting percent to decimal

A DVD player with a list price of $100 is marked down 30%. If John gets an employee discount of 20% off the sale price, how much does John pay for the DVD player?

A. $86.00 B. $77.60 C. $56.00 D. $50.00 E. $44.00

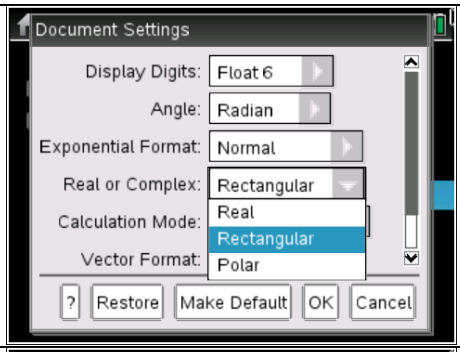
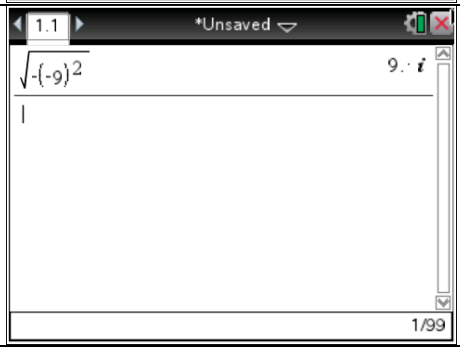
Type 100 × 30 Press ctrl and choose the % symbol, then press enter.	
Subtract the amount of the first discount from the original price.	
Repeat the process to find the total after the second discount.	

http://www.actstudent.org/sampletest/math/math_02.html

12. $\sqrt{-(-9)^2} = ?$

(Note: $i = \sqrt{-1}$)

F. $9i$ G. $9 + i$ H. $9 - i$ J. 9 K. -9

Change the settings in your handheld. Press [on]>Settings>Document Settings. Change *Real or Complex* to **Rectangular**. (This allows the handheld to produce complex answers). Click **Make Default** to change the scratchpad settings at the same time.	
Type the expression. Press [ctrl] [x²] to type the square root template.	

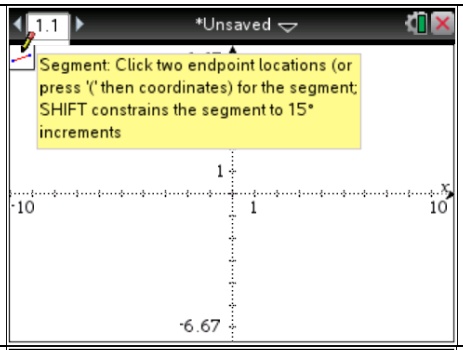
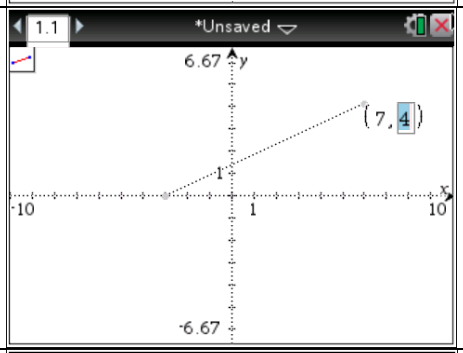
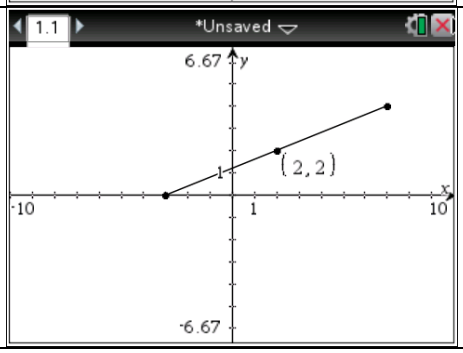
http://www.actstudent.org/sampletest/math/math_02.html

Coordinate Geometry - **Midpoints**

Find the midpoint given two ordered pairs

In the standard (x, y) coordinate plane, what are the coordinates of the midpoint of a line segment whose endpoints are $(-3,0)$ and $(7,4)$?

A. $(2,2)$ B. $(2,4)$ C. $(5,2)$ D. $(5,4)$ E. $(5,5)$

Press [menu]>Geometry>Points & Lines>Segment. Hover over the icon in the top left corner of the screen and you will see the hint about pressing "(" and then the coordinates to plot the segment.	
Press [(], then enter the x-value, -3. Press [enter], then enter the y-value, 0. Repeat to enter the 2nd ordered pair. Press [(], then enter the x-value, 7. Press [enter], then enter the y-value, 4.	
Press [menu]>Geometry>Construction>Midpoint, then click the segment. Use the Touchpad to hover your cursor over the midpoint and press [ctrl] [menu]>Coordinates & Equations.	

http://www.actstudent.org/sampletest/math/math_03.html

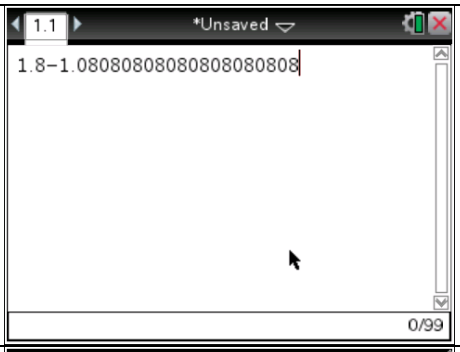
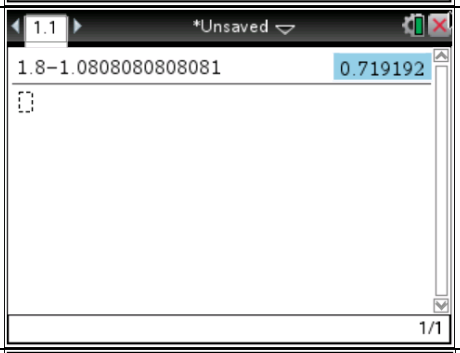
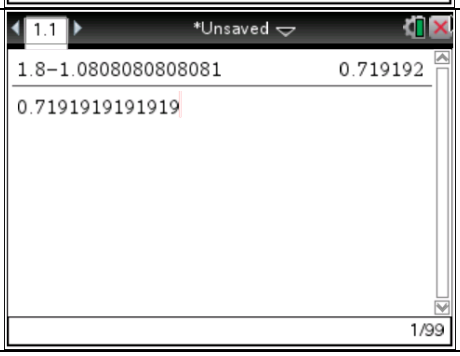
Pre-Algebra - **Decimals**

Basic operations with decimals

What is the difference between 1.8 and $1.\overline{08}$?

(Note: A bar indicates a digit pattern that is repeated.)

A. $0.7\overline{1}$ B. $0.\overline{71}$ C. $0.7\overline{19}$ D. $0.7\overline{2}$ E. $0.\overline{72}$

Type $1.8 - 1.0808080808080808080808$	
Press enter. Use the Touchpad to click up and highlight the calculated answer.	
Press enter to see more digits.	

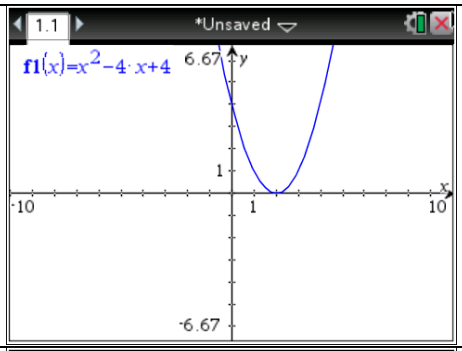
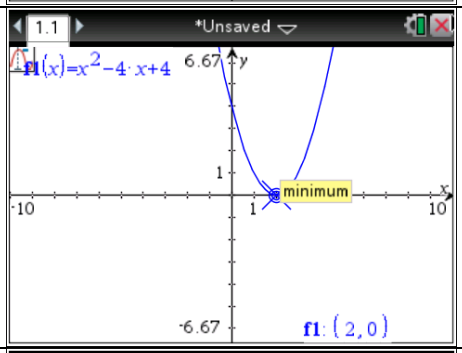
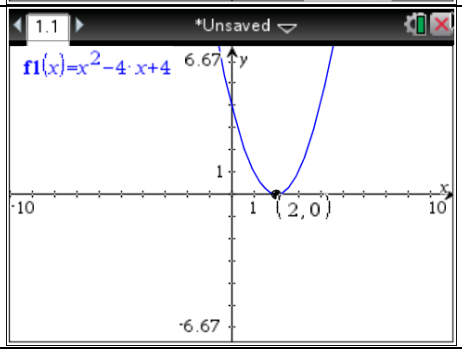
http://www.actstudent.org/sampletest/math/math_03.html

Intermediate-Algebra - **Zeros**

Finding roots of polynomials

What is the x −intercept of the graph of $y = x^2 - 4x + 4$?

A. -2 B. -1 C. 0 D. 1 E. 2

Type the function, $f1(x) = x^2 - 4x + 4$ into the entry line and press enter to graph it.	
Press menu >Trace>Graph Trace. Use the Touchpad to move to the right until it shows the minimum.	
Press enter to lay down the ordered pair for the zero of the graph.	

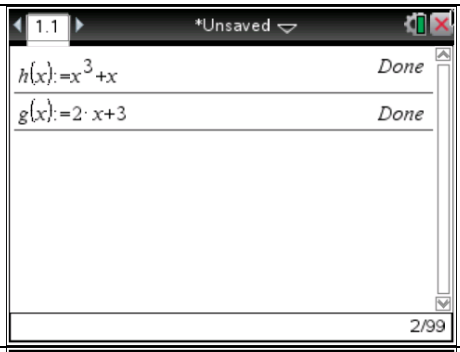
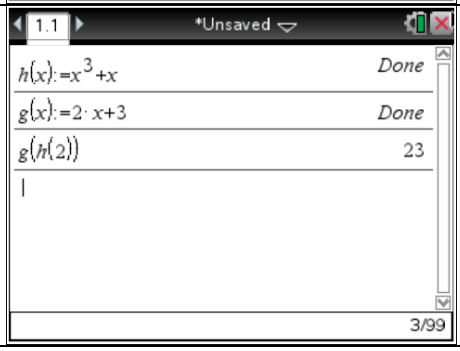
http://www.actstudent.org/sampletest/math/math_04.html

Intermediate Algebra - **Function Composition**

Composing functions

If $h(x) = x^3 + x$ and $g(x) = 2x + 3$, then $g(h(2)) = ?$

F. 7 G. 10 H. 17 J. 19 K. 23

Type $h(x)$, then press ctrl (this types a :=). Then type the function, $x^3 + x$. Press enter. Type $g(x)$, then press ctrl (this types a :=). Then type the function, $x^3 + x$. Press enter.	
Type $g(h(2))$ and press enter.	

http://www.actstudent.org/sampletest/math/math_04.html

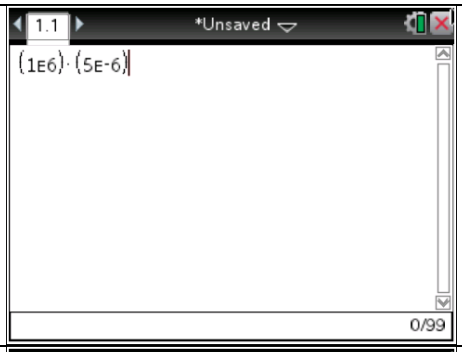
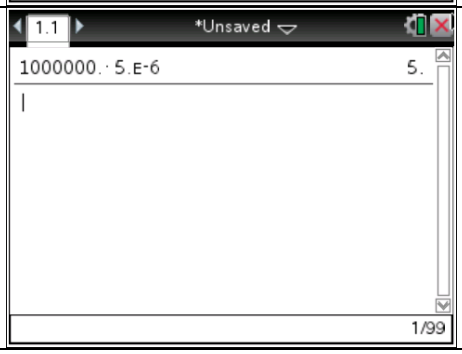
Pre-Algebra - **Scientific Notation**

Calculations involving scientific notation

A particly travels 1×10^{6} meters per second in a straight line for 5×10^{-6} seconds. How many meters has it traveled?

A. 2×10^{11} B. 5×10^{12} C. 5×10^{-12}

D. 5 E. 5×10^{-36}

Type 1, then type [EE] followed by the exponent, 6. Type 5, then type [EE] followed by the exponent, -6. (***Note:*** $1\text{E}6 = 1 \times 10^{6}$)	
Press [enter].	

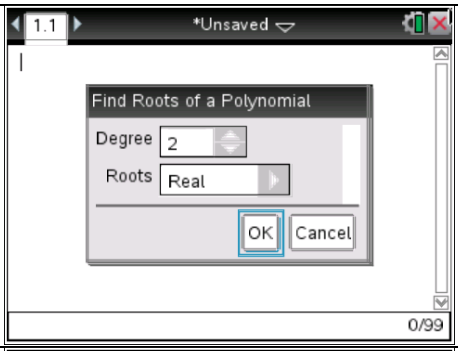
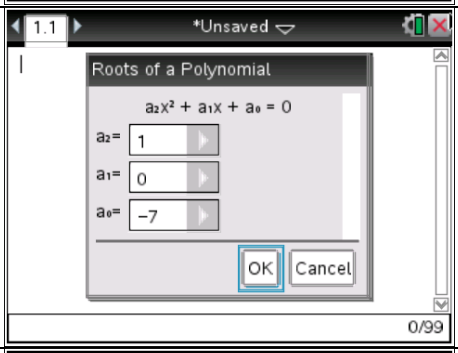
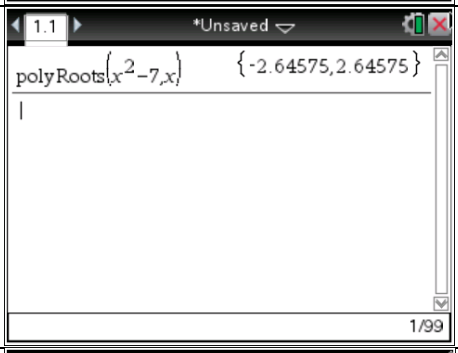
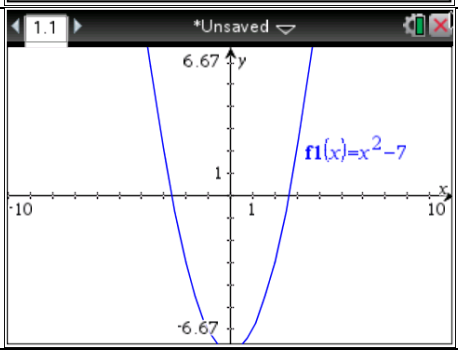
http://www.analyzemath.com/practice_tests/act/act_sample_1.html

Intermediate Algebra - **Roots of Polynomials**

Finding roots of polynomials

How many solutions are there to the equation $x^2 - 7 = 0$?

A. 1 B. 2 C. 4 D. 7 E. 14

Unlike the **Nsolve()** command, the **Polynomial Tools** can produce <u>multiple</u> solutions. Press menu >Algebra>Polynomial Tools>Find Roots of a Polynomial. Set the degree to 2 (default) and click OK.	
Enter the coefficients/constants for the given polynomial. Then click OK.	
Press enter . There are 2 solutions in the set. Note: CAS handhelds will produce the exact solutions of $\pm\sqrt{7}$.	
Alternatively, a graph of the function shows that there are two x −intercepts (therefore two solutions).	

http://www.analyzemath.com/practice_tests/act/act_sample_1.html

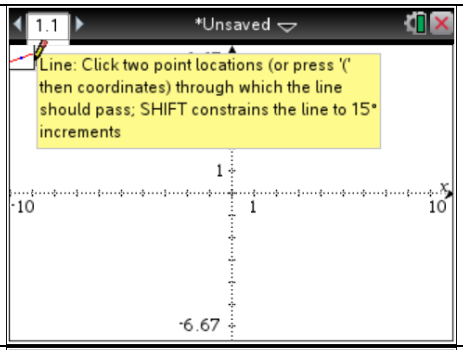
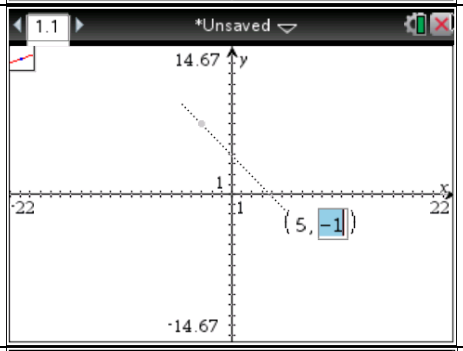
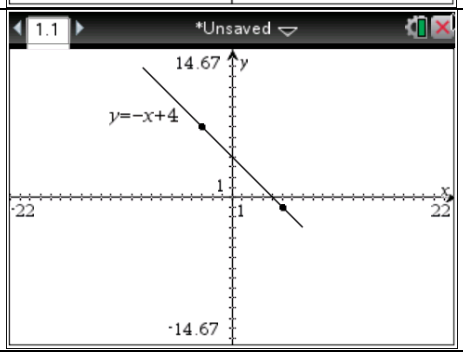
Coordinate Geometry - **Equation of a Line**

Linear equations in two variables

What is the equation of the line that contains the points with (x, y) coordinates $(-3,7)$ and $(5,-1)$?

A. $y = 3x - 2$ B. $y = x + 10$ C. $y = \frac{-1}{3}x + 8$

D. $y = \frac{-3}{2}x + 8$ E. $y = -x + 4$

Press [menu]>Geometry>Points & Lines>Line. Hover over the icon in the top left corner of the screen and you will see the hint about pressing "(" and then the coordinates to plot the segment.	
Press [(], then enter the x-value, -3. Press [enter], then enter the y-value, 7. Repeat to enter the 2nd ordered pair. Press [(], then enter the x-value, 5. Press [enter], then enter the y-value, -1.	
Use the Touchpad to hover your cursor over the line and press [ctrl] [menu]>Coordinates & Equations.	

http://www.act.org/compass/sample/algebra.html

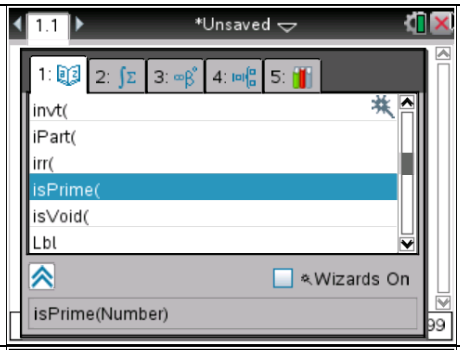
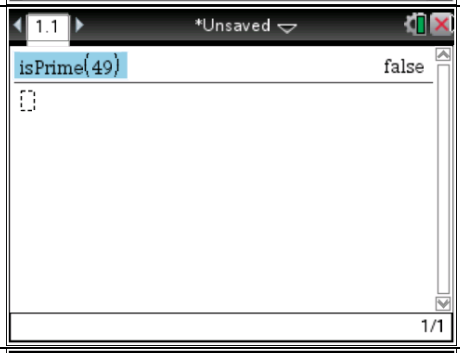
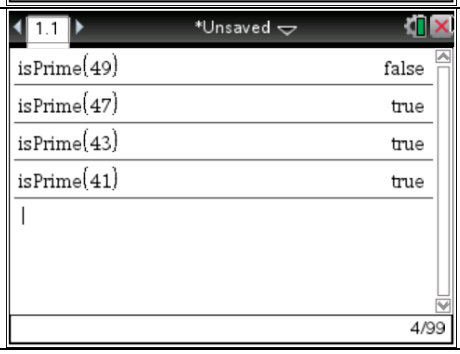
Pre-Algebra **- Prime Numbers**

Determining prime numbers

Which of the following lists gives the 3 largest prime numbers that are less than 50 ?

A. 5,7 and 11 B. 7,11 and 13 C. 41,43 and 47

D. 39,43 and 47 E. 43,47 and 49

TI-Nspire has a built in command for determining a prime number. Press [book] to access the catalog, then press [I] to jump to the commands that start with the letter i. Scroll down to the *isPrime()* command.	
Press [enter] and type in the number, 49. Press [enter] again to find out if it is prime. Use the Touchpad to click up and highlight the previous command. (Press [enter] to paste the command onto the next line.)	
Use the *isPrime()* command to test more of the numbers.	

http://www.education.com/reference/article/posttest39/

Coordinate Geometry - **f(y) Equations**

Relationship between points & lines

In the xy coordinate plane below, which of the following points has coordinates (x, y) such that $x = y - 2$?

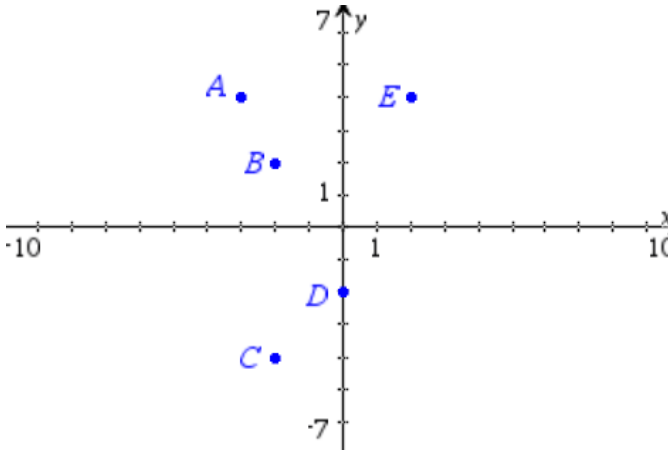
F. A

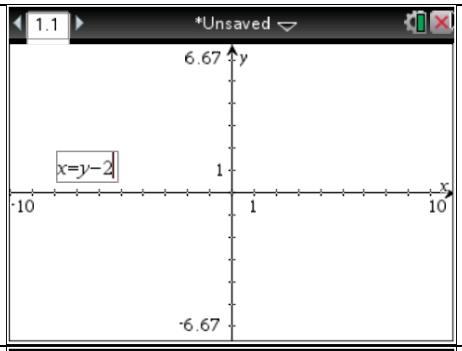
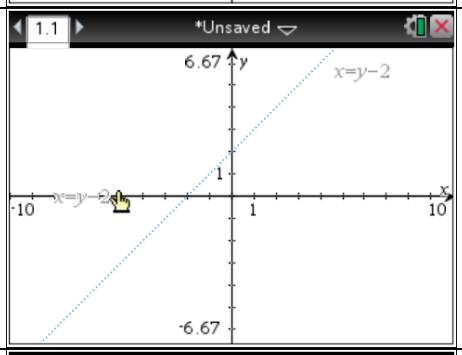
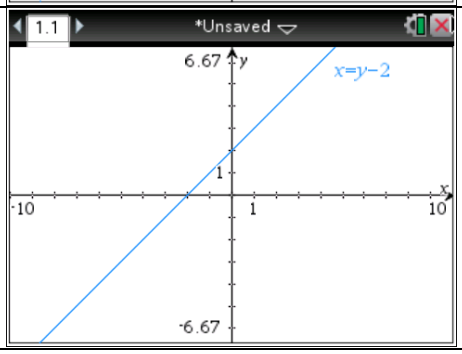
G. B

H. C

J. D

K. E



Move your cursor to an empty space and press [ctrl] [menu]>Text. Type, $x = y - 2$ and press [enter].	
Grab ([ctrl] [ ]) the equation text box and use the Touchpad to drag and drop it on the x −axis.	
Press [menu]>Trace>Graph Trace. Type, 4 to substitute a y −value of 4.	

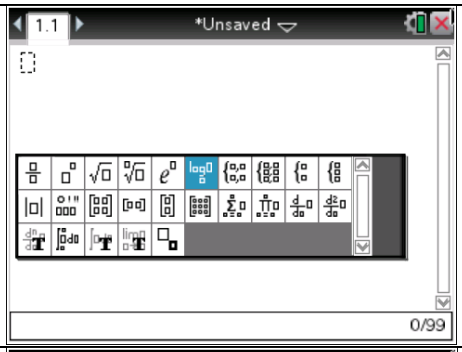
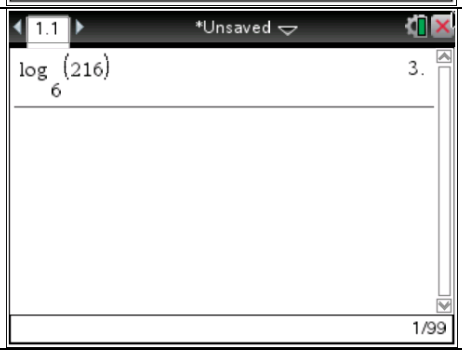
http://www.education.com/reference/article/posttest39/

Intermediate Algebra - **Logarithms**

Evaluating logarithms with base other than 10

Which of the following is a value that satisfies $\log_6(216) = x$?

A. 0 B. 1 C. 2 D. 3 E. 4

Press [ ] and choose the logarithm template.	
Type in the base and the number to take the log of, then press enter.	

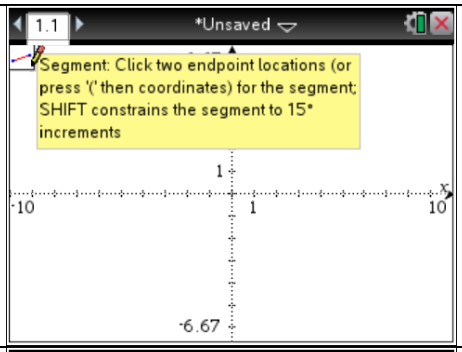
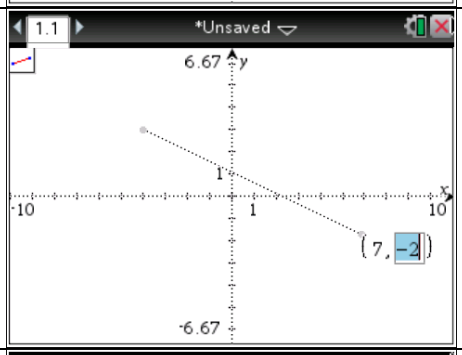
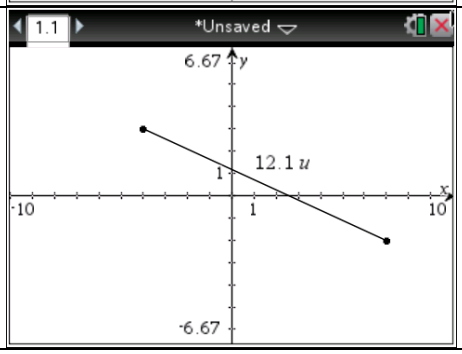
http://www.education.com/reference/article/posttest39/

Coordinate Geometry - **Distance**

Using the distance formula

What is the distance, in coordinate units, between the points $(-4,3)$ and $(7,-2)$ in the standard (x,y) coordinate plane?

A. $\sqrt{14}$ B. $\sqrt{98}$ C. $\sqrt{146}$ D. 15 E. 21

Press [menu]>Geometry>Points & Lines>Segment. Hover over the icon in the top left corner of the screen and you will see the hint about pressing "(" and then the coordinates to plot the segment.	
Press [(], then enter the x-value, -4. Press [enter], then enter the y-value, 3. Repeat to enter the 2nd ordered pair. Press [(], then enter the x-value, 7. Press [enter], then enter the y-value, -2.	
Use the Touchpad to hover your cursor over the segment and press [ctrl] [menu]>Measurement>Distance.	

http://www.education.com/reference/article/posttest39/