TI-84 Standardized Test Prep compatible with the ACT

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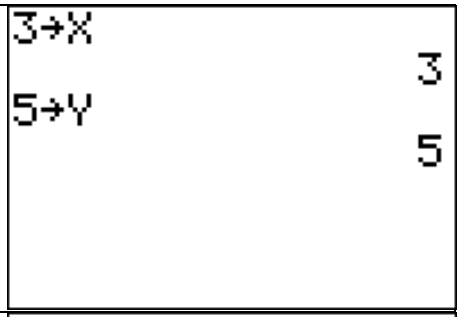
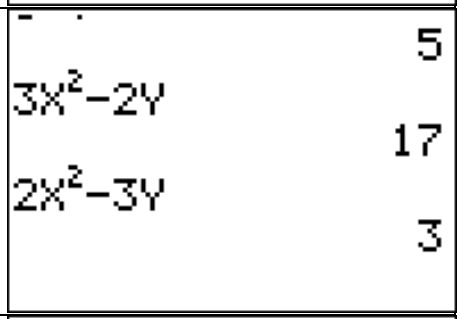
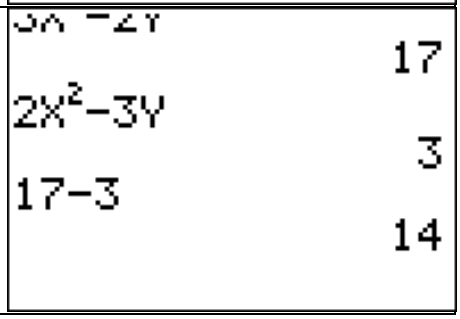
IMPORTANT: Make sure to update your TI-84 Operating System (OS). Update to at least level 2.55 for the steps in this document to work properly

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 3 STO▶ X,T,Θ,n to store the value of x. Press ENTER. Type 5 STO▶ ALPHA 1 to store the value of y. Press ENTER.	
Type each expression and press ENTER after each expression to calculate it.	
Subtract these two calculated values.	

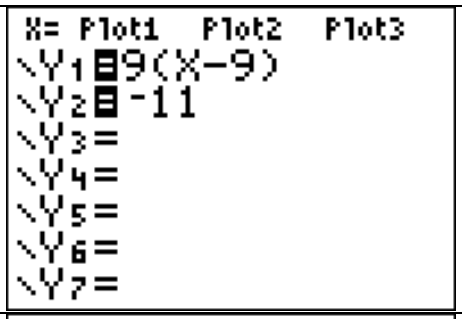
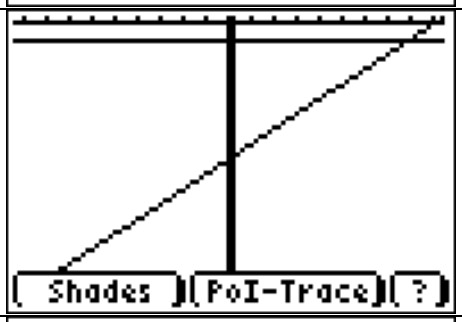
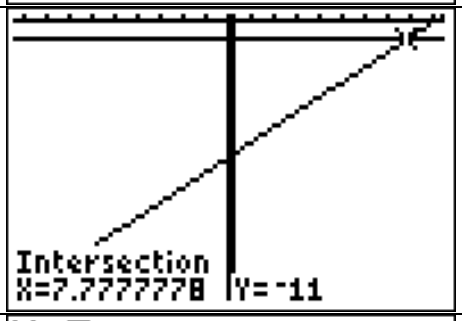
http://www.actstudent.org/sampletest/math/math_01.html

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 [Y=] and type the left and right side of the equation as your first two functions.	
Press [ZOOM]>Fit (to get a better window of the graph).	
Press [2nd][TRACE][5][ENTER][ENTER][ENTER] to find the coordinates of the intersection point. The x −value of the intersection point is the solution.	
Press [2nd][MODE] and type [X,T,Θ,n]. Then press [MATH]>Frac, to convert the decimal to a fraction.	

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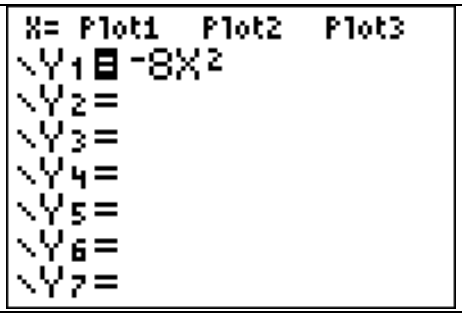
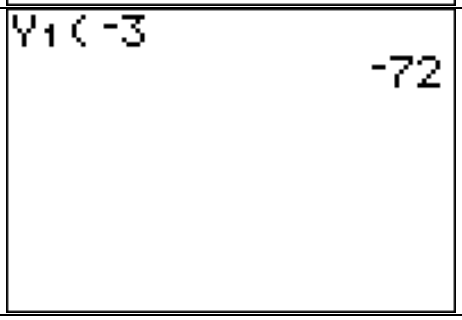
Intermediate Algebra - **Functions**

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

Press [Y=] and type the function.	
Press [2nd][MODE] to access a calculator screen. Press [VARS]>Y-Var>Y_1	
Type [(][(-)][3] and press [ENTER] to calculate the answer.	

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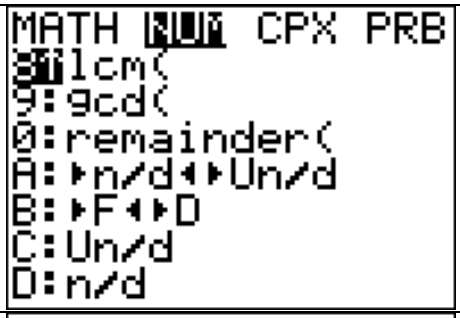
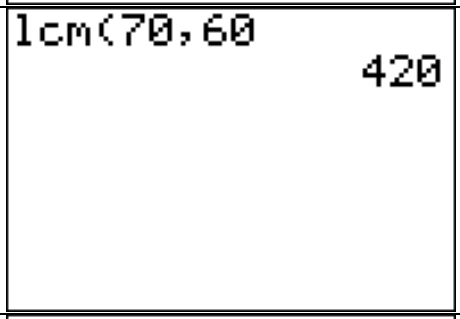
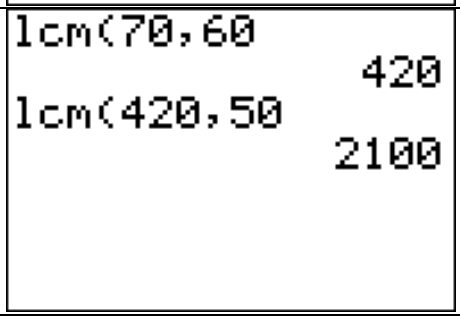
Pre-Algebra **- Lowest Common Multiple**

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 [MATH] then arrow to the **NUM** drop-down menu and choose **LCM(**.	
Type 70,60 and press [ENTER].	
Arrow up to highlight the LMC(70,60 expression and press [ENTER] to copy/paste it. Change the values to reflect the answer to the first and the 3rd number, 50.	

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Intermediate Algebra **- Modeling**

Find the function given a set of data

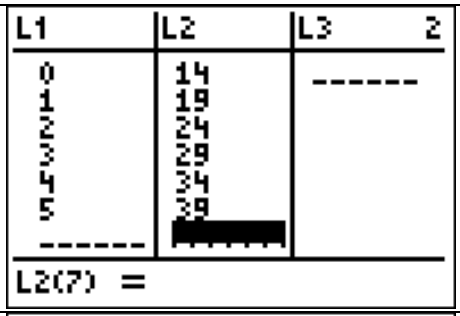
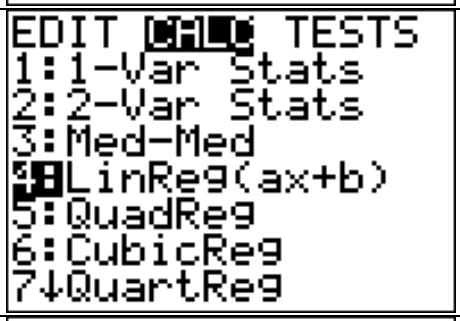
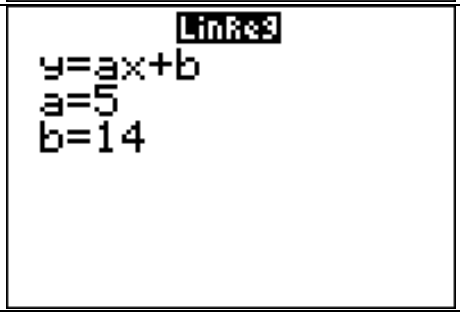
As Part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance, y feet, of the cart from a reference point at 1 −second intervals from $t = 0$ seconds to $t = 5$ seconds.

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. $y = 19t$

Press [STAT]>Edit, then type the data into list L_1 and L_2	
Press [2nd][MODE] to access a calculator screen. Press [STAT] and use your arrow keys to navigate to the **CALC** drop-down menu. Choose **LinReg(ax+b)** to perform a linear regression.	
Press [enter] multiple times to calculate the linear regression.	

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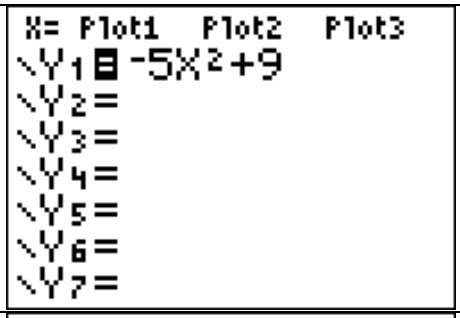
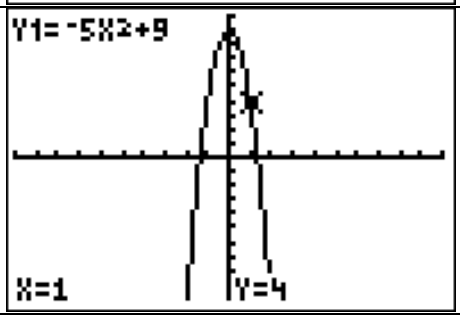
Coordinate Geometry - **Points**

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

Press [Y=] and type the function.	
Press [TRACE] [1] [ENTER] to find the y −value when $x = 1$.	
Solve $2a = 4$ (Hopefully, you don't need a calculator for this step).	

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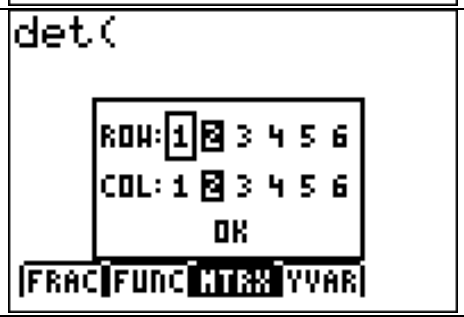
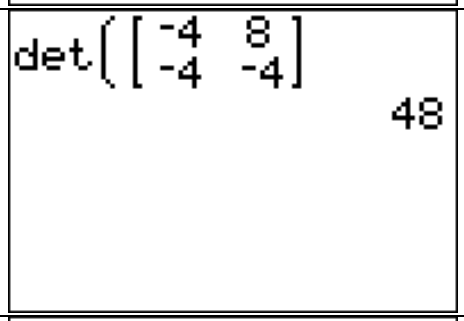
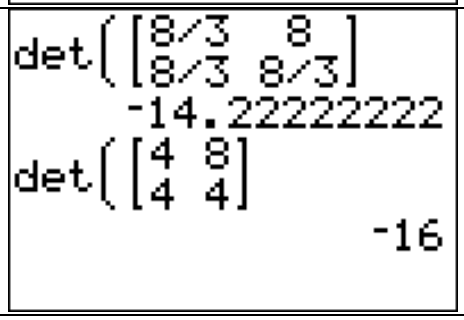
Intermediate Algebra - **Matrices**

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 2nd x^{-1} and then arrow to the MATH drop-down menu to access the matrix commands. Choose **det(**	
Press ALPHA ZOOM and choose a 2×2 matrix, arrow down to the OK button to confirm.	
Change the values and start substituting the values starting with -4.	
Arrow up to highlight the expression and press ENTER to copy/paste the expression. Keep changing the values to test each of the answer choices.	

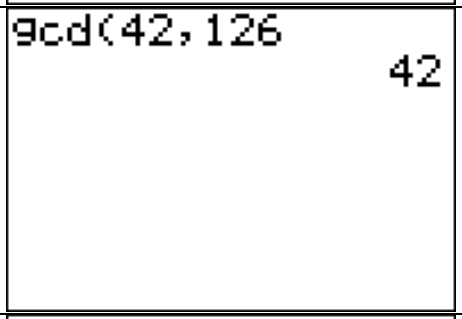
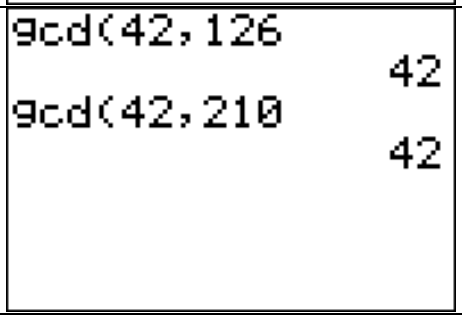
http://media.actstudent.org/documents/preparing.pdf

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

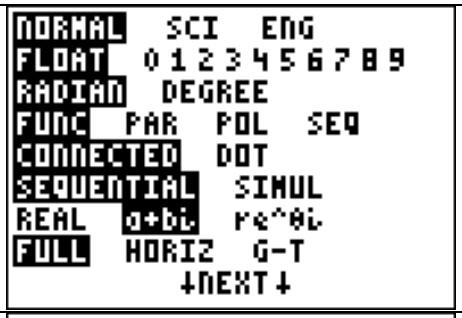
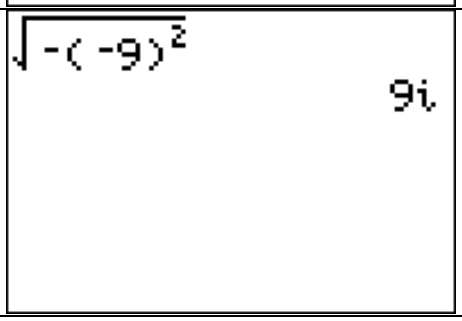
Press MATH and use the arrows to navigate to the **NUM** drop-down menu. Choose the **gcd(** command.	
Type 42,126 and press ENTER.	
Use the arrow keys to move up and highlight the expression, then press ENTER to copy/paste it. Find the GCD of the value you just calculated and the 3rd number, 210.	

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

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

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

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

First, change the mode. Press [MODE] and change REAL to $a + bi$. Press [2nd][MODE] to access the calculator screen.	
Type the expression and press [ENTER].	

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

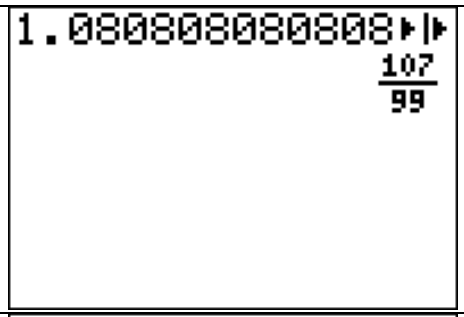
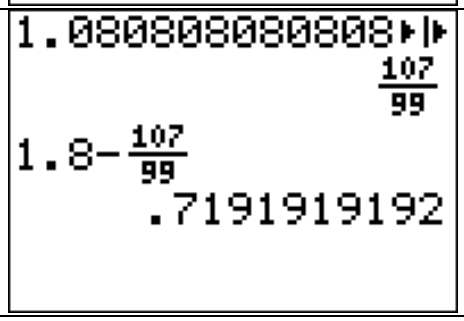
Pre-Algebra - **Decimals**

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 1.0808080808080808080808 Press MATH>Frac to convert the decimal to a fraction.	
Subtract the fraction from 1.8	

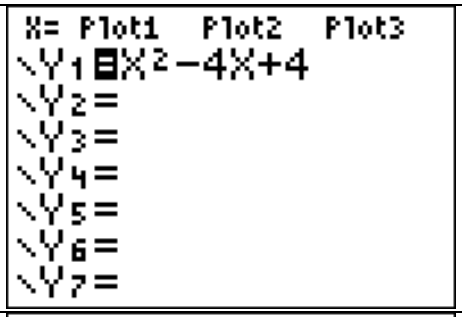
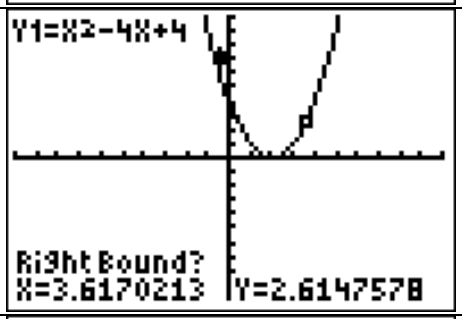
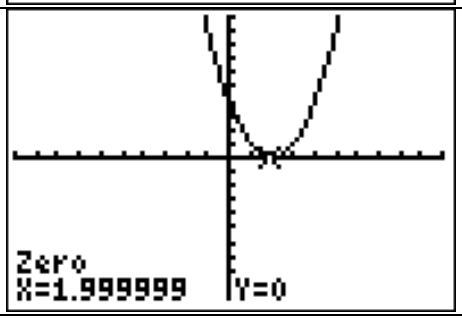
http://www.actstudent.org/sampletest/math/math_03.html

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 [ZOOM]>Standard to graph the function. Press [2nd][TRACE]>Zero. Move the cursor to the left of the zero and press [ENTER], then move the cursor to the right of the zero and press [ENTER] again.	
Press [enter] to guess. Note: A graph is an approximate environment, the calculator had trouble identifying the exact value of $x = 2$, but it was very close.	

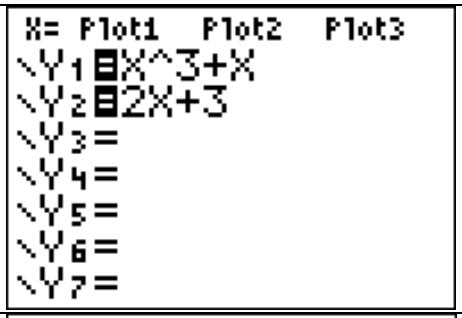
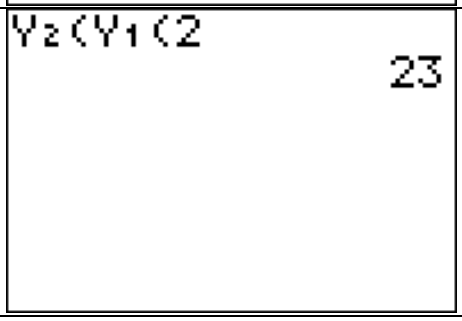
http://www.actstudent.org/sampletest/math/math_04.html

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].	
Press [2nd] [MODE] to access the calculator page. Press [VARS]>Y-Vars>Y_2 Press [(]	
Press [VARS]>Y-Vars>Y_1 Press [(], then type 2 and press [ENTER].	

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

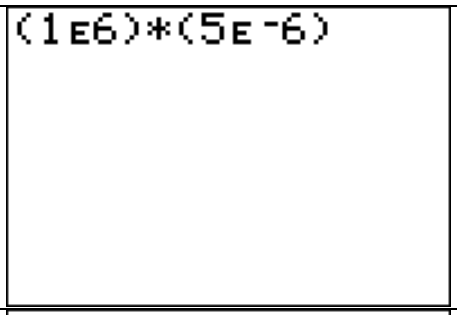
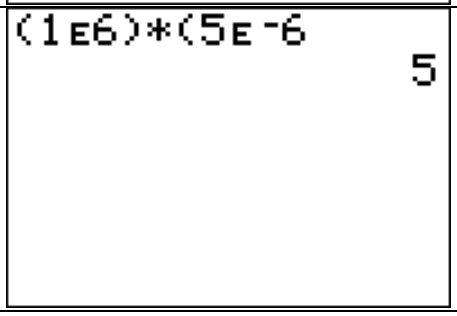
Pre-Algebra - **Scientific Notation**

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 2nd , followed by the exponent, 6. Type 5, then type 2nd , followed by the exponent, -6. (***Note:*** $1\text{E}6 = 1 \times 10^6$)	
Press enter.	

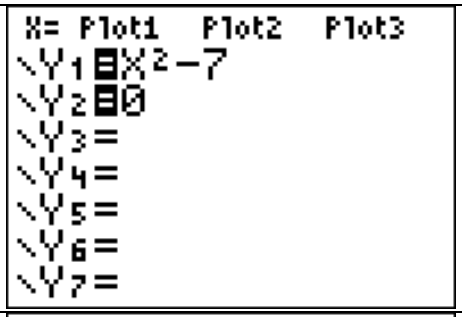
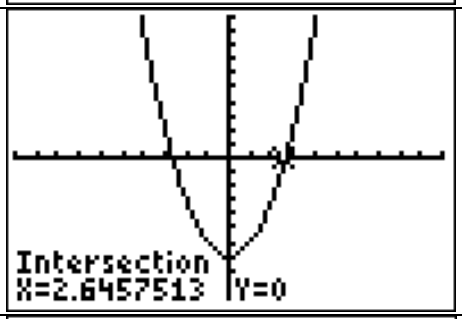
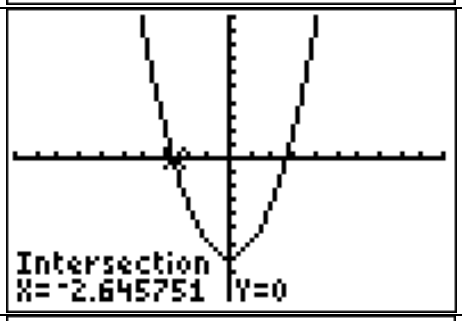
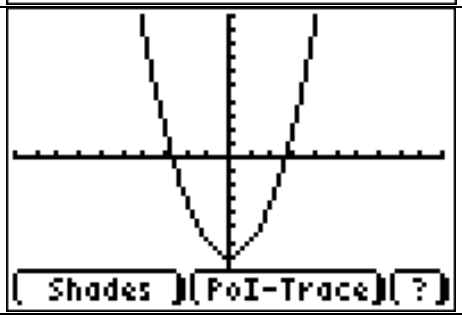
http://www.analyzemath.com/practice_tests/act/act_sample_1.html

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

To find the solutions, graph the quadratic function and locate the zeros on the graph. Begin by pressing [Y=] and graphing the left & right sides of the equation as two separate functions.	
Press [ZOOM]>Standard to graph the functions. Press [2nd][TRACE]>Intersection, then press [ENTER] three times.	
Repeat the process: Press [2nd][TRACE]>Intersection, then press [ENTER] two times. But, before you press [ENTER] the 3rd time, move your cursor to the left and the other zero will be recognized.	
Of course, since this question only asked for the number of roots, the original graph would have sufficed (there are two x −intercepts).	

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

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 $x = y - 2$?

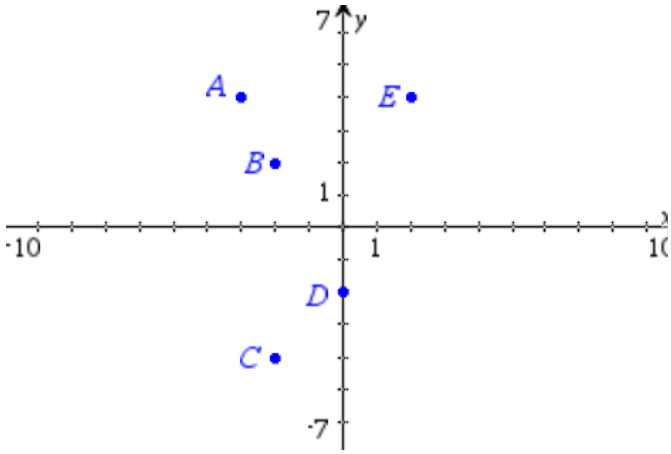
F. A

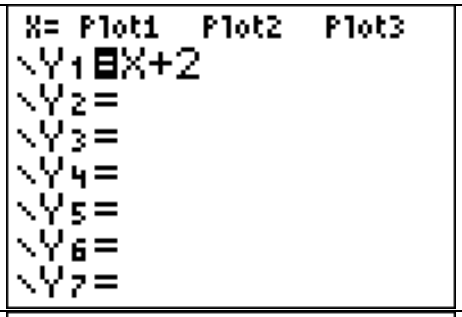
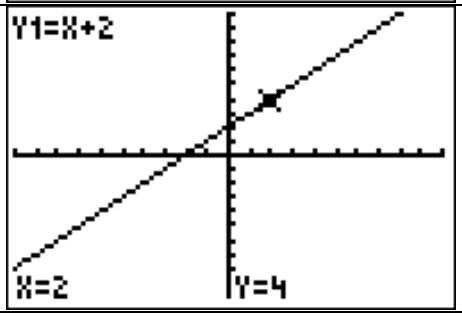
G. B

H. C

J. D

K. E



Solve the equation for y and type in the [Y=] screen.	
Press [ZOOM]>Standard to graph the function. Press [TRACE] and type, 2, then [ENTER].	

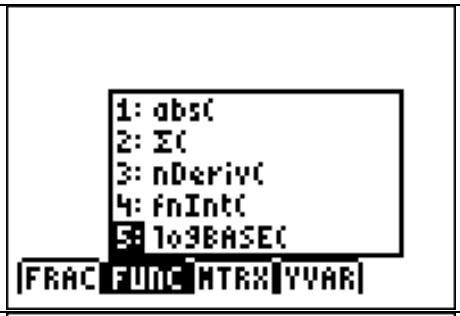
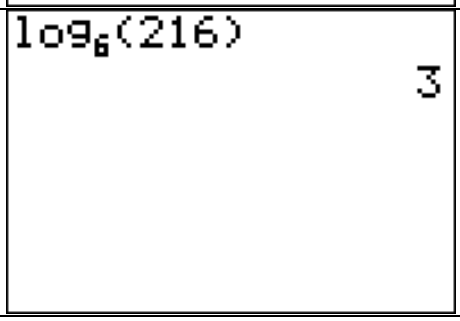
http://www.education.com/reference/article/posttest39/

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 ALPHA WINDOW >logBASE(	
Type in the base and the number, then press ENTER.	

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

Coordinate Geometry - **Circles**

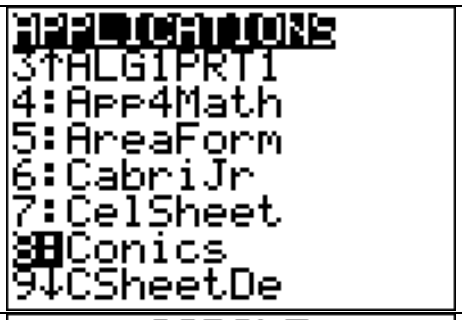
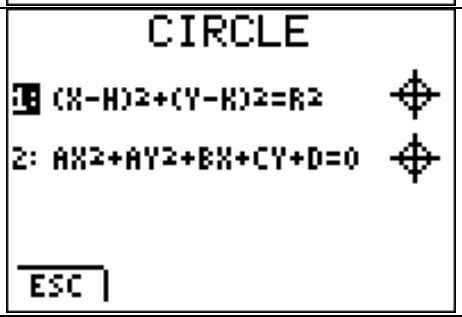
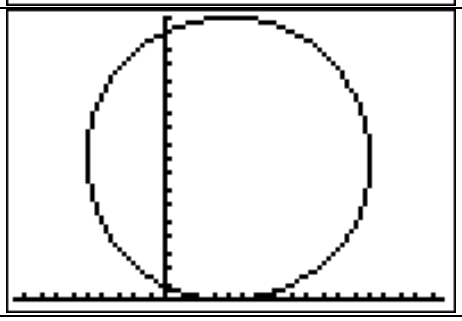
Relations between equations and graphs

A circle in the standard (x, y) coordinate plane has center $(4,9)$ and radius of 9 coordinate units. Which of the following is an equation of the circle?

A. $(x-4)^2-(y-3)^2=9$ B. $(x+4)^2+(y+9)^2=9$

C. $(x-4)^2-(y-9)^2=81$ D. $(x-4)^2+(y-9)^2=81$

E. $(x+4)^2-(y-9)^2=81$

Press the APPS key and scroll down to the **Conics** app.	
Choose Circle from the menu and then choose the first choice for the form of the circle. (Hint: Just seeing the formula may be enough to job your memory to solve the problem)	
Change the h, k and r values.	
Note: Choosing a value of 9 for r, means that the formula will be = 81. Since both h and k are being subtracted in the formula, D is the correct answer.	

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

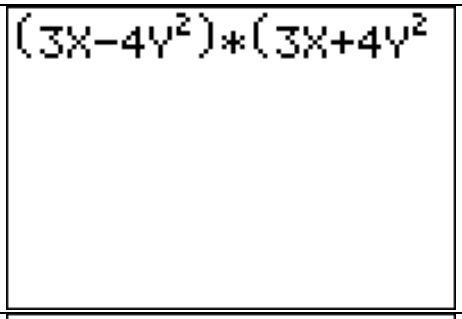
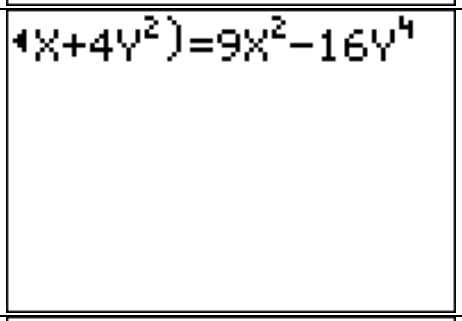
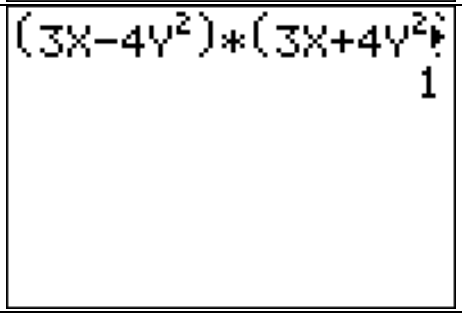
Elementary Algebra - **Expanding Binomials**

Understanding algebraic operations

The expression $(3x - 4y^2)(3x + 4y^2)$ is equivalent to:

A. $9x^2 - 16y^4$ B. $9x^2 - 8y^4$ C. $9x^2 + 16y^4$

D. $6x^2 - 16y^4$ E. $6x^2 - 8y^4$

Type the expression, $(3x - 4y^2)(3x + 4y^2)$ on a calculator screen.	
Press 2nd MATH and choose the equals sign. Then type the first answer choice on the right side of your equation.	
Press ENTER. The calculator is evaluating whether the statement is true (1) or false (0). Since a 1 displays, the correct answer has been chosen.	

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

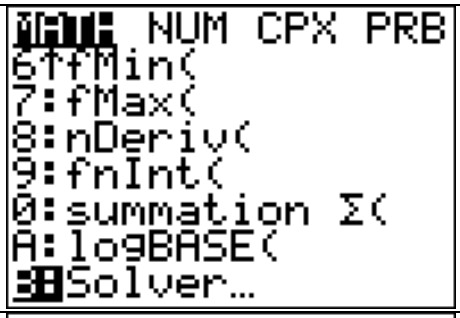
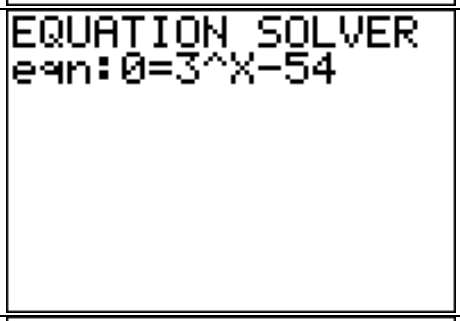
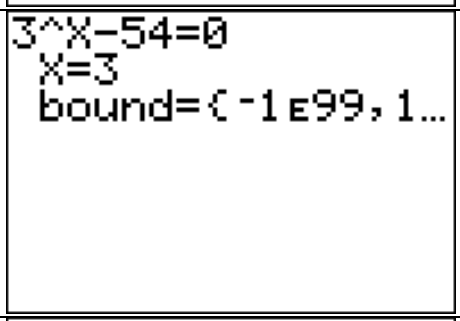
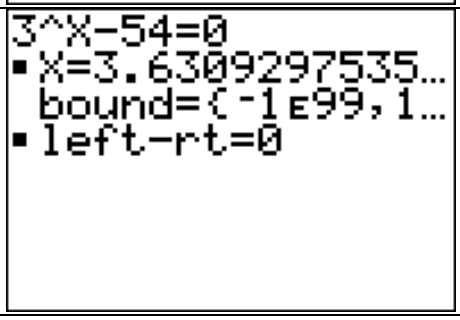
Pre-Algebra - **Exponents**

Solving equations with exponents

If $3^x = 54$, then which of the following must be true?

A. $1 < x < 2$ B. $2 < x < 3$ C. $3 < x < 4$

D. $4 < x < 5$ E. $5 < x$

Press the MATH key and scroll down to **Solver**.	
To solve the equation $3^x = 54$, you must set it equal to zero first. If you subtract 54 from both sides, you get $0 = 3^x - 54$. Type this in to the solver.	
Scroll down and make a 'guess' where it says, X=. A guess can be any number that you think could be the answer. On this problem, you could guess, X= 3.	
Press ALPHA ENTER to solve the equation.	

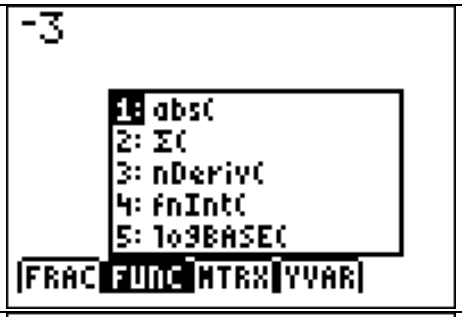
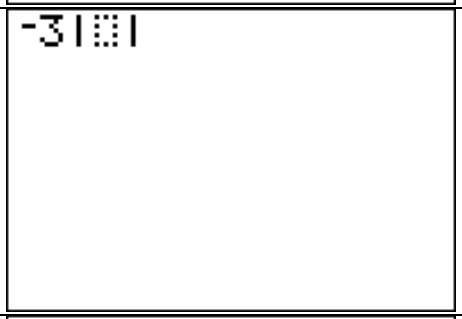
http://media.act.org/documents/preparing.pdf

Pre-Algebra - **Absolute Value**

Evaluating absolute value expressions

$-3|-6+8| = ?$

F. -42 G. -6 H. -1 J. 6 K. 42

Start typing the expression, -3 then press [ALPHA][WINDOW] to access the absolute value command.	
Choose the **abs(** command.	
Type, $-6+8$ between the absolute value signs. Press [ENTER] to evaluate the expression.	
Alternatively, you could press [2nd][0] to access the absolute value command in the catalog.	

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

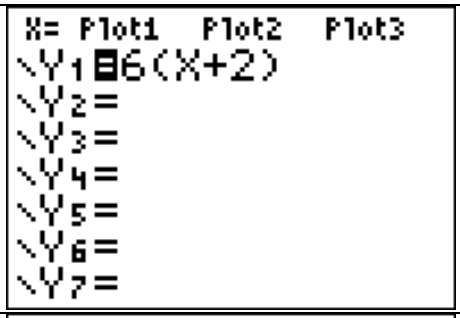
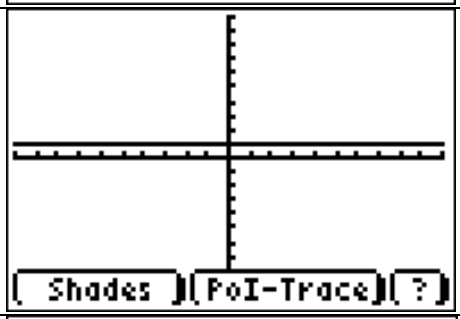
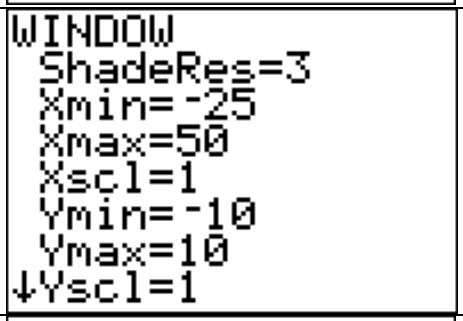
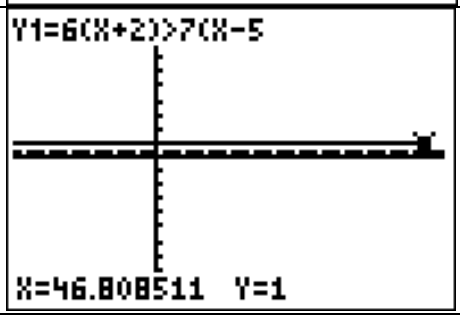
Intermediate Algebra - **Inequalities**

Solving inequalities

The inequality $6(x+2) > 7(x-5)$ is equivalent to which of the following inequalities?

A. $x < -23$ B. $x < 7$ C. $x < 17$

D. $x < 37$ E. $x < 47$

Press [Y=] and start typing the inequality.	
Press [2nd][MATH] and choose the $>$ symbol. Finish typing the expression, $7(x-5)$, then press the [GRAPH] key. Hint: When the inequality is TRUE, a line is graphed at $y = 1$.	
Since the graph starts/ends outside of the viewing window, change the x-min and x-max. Press [WINDOW] and change the Xmin=-25 and the Xmax=50	
Press [TRACE] to find the start of the graph near 47.	

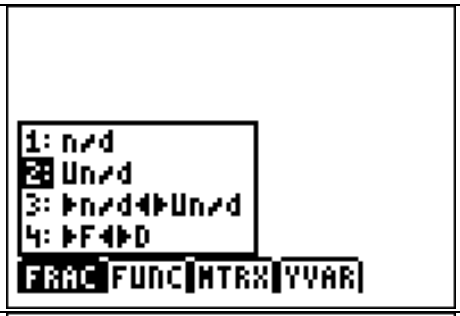
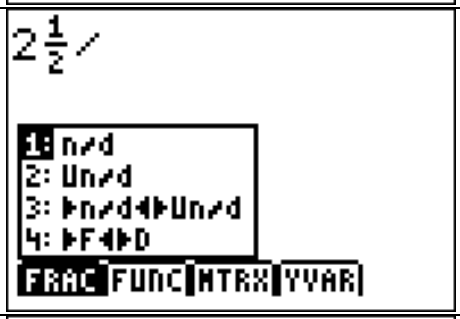
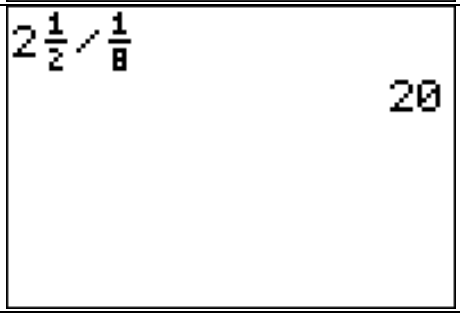
http://media.act.org/documents/preparing.pdf

Pre-Algebra **- Mixed Numbers**

Evaluating expressions with mixed numbers

The lead of a screw is the distance that the screw advances in a straight line when the screw is turned 1 complete turn. If a screw is $2\frac{1}{2}$ inches long and has a lead of $\frac{1}{8}$ inch, how many complete turns would get it all the way into a piece of wood?

A. 5 B. 10 C. 15 D. 20 E. 25

Press [ALPHA] [Y=] to access the fraction tools. Choose **Un/d** to access the mixed number template.	
Type in the mixed number, $2\frac{1}{2}$ then press [÷] and access the fraction tools again by pressing [ALPHA] [Y=] . Choose **n/d** to access the fraction template.	
Type the fraction, $\frac{1}{8}$ and press [ENTER] to evaluate the expression.	

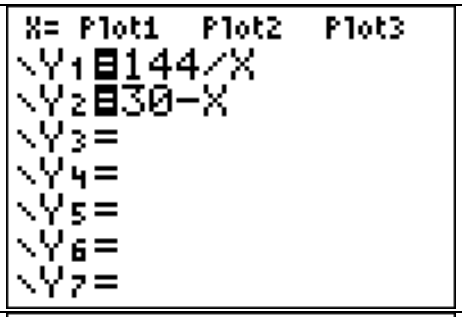
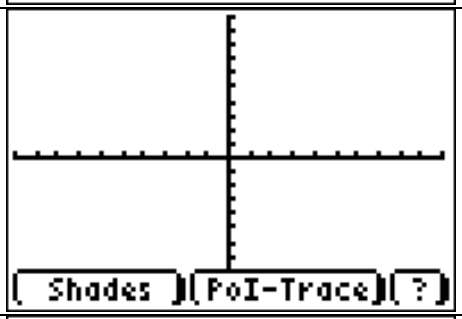
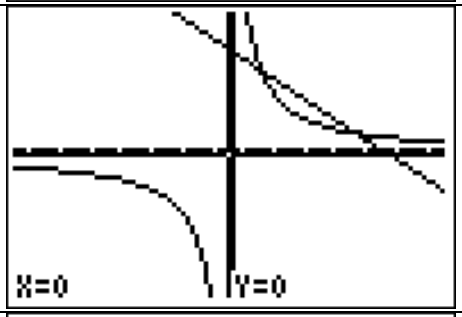
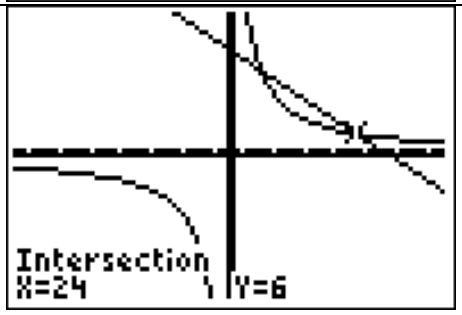
http://www.actstudent.org/sampletest/math/math_02.html

Intermediate Algebra - **Systems**

Solving systems of equations

If $xy = 144$, $x + y = 30$, and $x > y$, what is the value of $x - y$?

F. 4 G. 6 H. 18 J. 22 K. 24

Solve both equations for y. Press [Y=] and type the equations.	
Press [ZOOM] [6] to graph the functions. Notice, the graphs are outside the standard viewing window.	
Press [ZOOM] and choose Zoom Out. Press [ENTER] to zoom out until you see the graphs.	
Press [2nd] [TRACE] [5] and move the cursor to choose the first curve (the first function), press [ENTER]. Then use the cursor to identify the second curve (the second function), and press [ENTER] again. Finally move the cursor near the intersection point on the right and press [ENTER].	

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

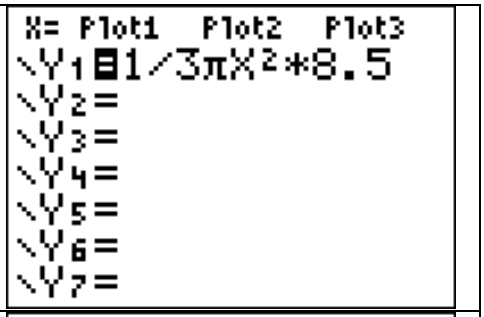
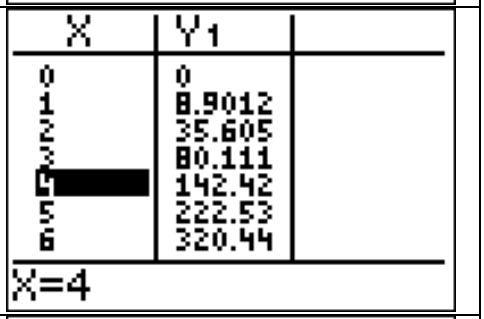
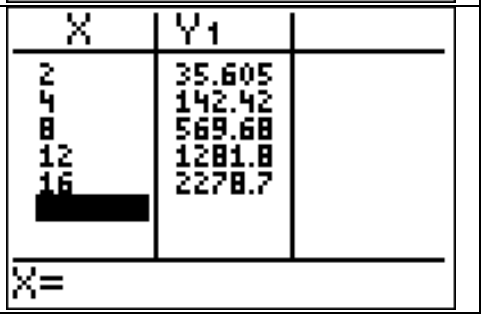
Elementary Algebra - **Substitution**

Using tables to substitute values in expressions

The volume, V, of the right circular cone with radius r and height h can be found using the formula $V = \frac{1}{3}\pi r^2 h$.

A cone-shaped paper cup has a volume of 142 cubic centimeters and a height of 8.5 centimeters. What is the radius, to the nearest centimeter, of the paper cup?

A. 2 B. 4 C. 8 D. 12 E. 16

Type the right-side of the equation. Make sure to substitute 8.5 for h and use the [X,T,Θ,n] key instead of r.	
Press [2nd][GRAPH] to access the table. You should be able to identify the solution.	
Alternatively, press [2nd][WINDOW] and change the Indpnt to Ask.	
By typing values for x and pressing [ENTER], you can substitute multiple values for x.	

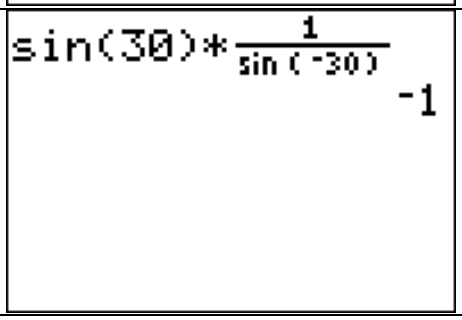
http://www.actstudent.org/sampletest/math/math_02.html

Trigonometry - **Trig Identities**

Evaluating trigonometric expressions

Which of the following is equivalent to $\sin(\theta) \cdot \csc(\theta)$ is defined?

F. -1 G. 1 H. $-\tan(\theta)$ J. $\tan(\theta)$ K. $-sin^2(\theta)$

Press the [MODE] key and change the setting to DEGREE mode.	
Choose an angle in the first quadrant...like $30\ degrees$ Substitute this value into the expression. Press [ENTER] to evaluate the expression	

http://www.actstudent.org/sampletest/math/math_05.html