SOLVING WORD PROBLEMS AND EQUATIONS
USING THE GRAPHING CALCULATOR

1. Find the solution set of $10x - 55 + 5(7 - 3x) = 11(x + 3) - 29 - 4x$, using the graphing calculator.

Two possible methods:

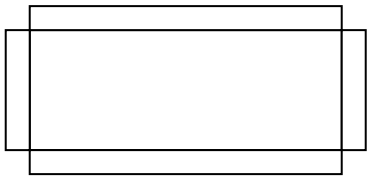
Method 1. Set each side of the equation equal to y and then graph the two linear functions: $y = 10x - 55 + 5(7 - 3x)$ and $y = 11(x + 3) - 29 - 4x$. The solution to the original equation will be the x-coordinate of the intersection point of the two new functions.

Method 2. Rewrite the original equation so that all terms are on one side of the equals sign: $10x - 55 + 5(7 - 3x) - 11(x + 3) + 29 + 4x = 0$. Then graph the functions $y = 10x - 55 + 5(7 - 3x) - 11(x + 3) + 29 + 4x$ and $y = 0$. Find the intersection point of these two functions on the x-axis (the "zero" of the rewritten function), as described above. The x-coordinate will be the solution to the original equation.

2. Find the solution set of $3x^2 - 12x - 6.75 = 0$, using the graphing calculator. Graph the functions $y = 3x^2 - 12x - 6.75$ and $y = 0$. Find the x-coordinates of the two points on the x-axis, as described above. (Note: Solving a quadratic equation is the same as finding the zeros (x-intercepts) of the corresponding quadratic function. That is, you must find the points on the curve where the y-coordinate is zero.)

TRY THIS

1. Given an 8.5" by 11" piece of paper. Suppose squares of equal size, x by x, are cut out of the 4 corners and the edges are then folded up to make an open-topped box. Find the dimensions of the box of maximum volume, which can be constructed from this piece of paper.



a. Find an algebraic expression for the length of the box.

b. Find an algebraic expression for the width of the box.

c. Using x for the height, write an algebraic equation for the volume of the box.

d. What is the domain of your function? In other words, what are the possible values of x? Explain your answer.

e. Graph the function on a graphing calculator.

f. What is the maximum volume that once can achieve?

g. What are the dimensions of the box?

2. The height *h* of a rocket above the ground, *t* seconds after being launched vertically with an initial velocity of 500 feet/second, from a height of 300 feet is given by the function $h = -16t^2 + 500t + 300$.

Graph the function and use the graph to answer the following questions:

a. At what time(s) is the rocket 2800 feet above the ground?

b. Will the rocket ever reach a height of 4000 feet?

c. What is its maximum height?

d. How long does it take the rocket to reach its maximum height?