Solving on the 89

To solve any equation, like $2x^3 - 5x^2 + 4x - 5 = 3x - 7$ we have at least four options. Some of these we have already seen.

Graphical

We can graph $y1 = 2x^3 - 5x^2 + 4x - 5$ and $y2 = 3x - 7$ separately, use the Intersection utility in the Math menu, using the key strokes: F5 5 to get the intersection of the two graphs.

How many solutions can you find?

Try to solve $\sqrt{16 - x^2} = 3 - .5x$ in this manner.

Solve

When solving basic equations with only one unknown variable we can use the built-in solve command. Go into your Algebra menu by pressing F2 and press 1 to bring up

solve(

Next, type the equation, followed by a comma, the variable you wish to solve for and a closing parenthesis.

For example, to solve $x^2 + 5x - 30 = 0$ for the unknown, you should type:

solve($\boldsymbol{x\hat{}2 + 5 * x - 30 = 0, x}$)

Press ENTER to get the result.

Polynomial Root Finder

Whenever we deal with what is called a polynomial, that is a combination of terms of the form ax^n, i.e. different powers of x, we can use a Flash Application called the Polynomial Root Finder. Go into the Application Menu by pressing the APPS key. Next go into FlashApps and go into the Polynomial Root Finder. Finally, choose New. Now, you must enter the highest power of x for the

Degree=

and enter the equation in the form:

$$a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0 = 0$$

So, to solve: $2x^4 + 2x^3 - 26.5x^2 - 13.5x + 63 = 0$, the screen asks for the Degree=... Enter the highest power of x, 4 in this case. Then, we enter the coefficients (the numbers in front of the x's) where we see a_4 and the other a's, starting with the highest powers of x in descending order, i.e. $a_4 = 2$, $a_3 = 2$, $a_2 = -26.5$, $a_1 = -13.5$, $a_0 = 63$.

After you have all of the numbers entered, press F5 for Solve.

We get $x_1 = -3.5$, $x_2 = 3$, $x_3 = -2$, $x_4 = 1.5$ as the solutions.

Now, try this with $6x^5 - 77x^4 + 213x^3 - 19x^2 - 315x = 0$.

Done in LaTeX.