Manning's Equation Solver

This is a function that will solve unknown variables in the Manning's equation. The Manning's equation is used to determine hydraulic characteristics of a channel based on other know information although it's primarily interested in the flow (Q.) Below is the Manning's equation:

Manning's Equation:

$$Q = VA = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$

$$Q = VA = \left(\frac{1.00}{n}\right) AR^{\frac{2}{3}}\sqrt{S} \quad [SI]$$

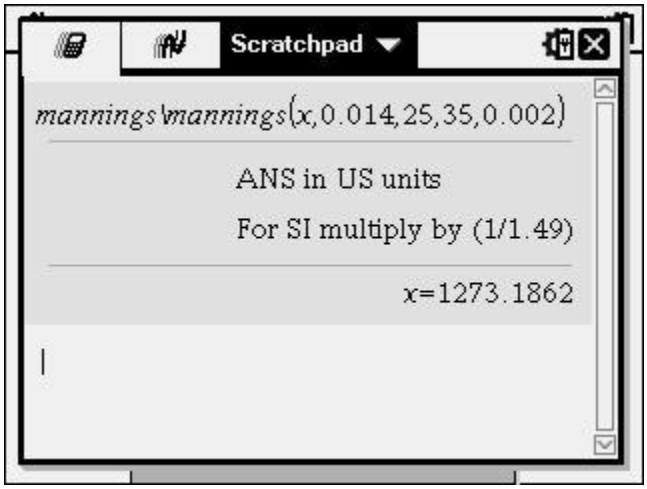
Where:

Q = Flow Rate, (ft^3/s)
v = Velocity, (ft/s)
A = Flow Area, (ft^2)
n = Manning's Roughness Coefficient
R = Hydraulic Radius, (ft)
S = Channel Slope, (ft/ft)

My program uses the coefficient of 1.49 or US units. A simple conversion factor of (1/1.49) can simply be multiplied to convert it to SI assuming you are using those respective units i.e. meters instead of feet. A full definition will not be given for SI units as above although you can find this easily on the internet to make sure your units are correct. Please may sure after downloading to place mannings.tns in the "MyLib" folder in the root directory of your calculator. Also please refresh you library by going to your calculator, selecting "6: Refresh Libraries". And now for the example:

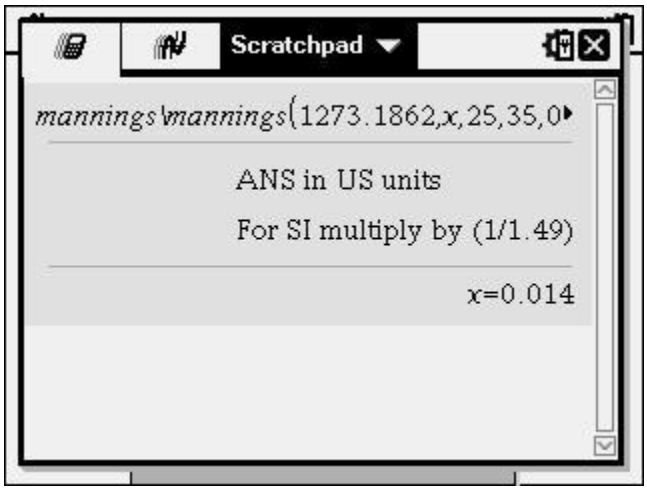
Select the program from your library:

You will then input your variables as the wizard indicates. For example let's say you have an open channel which you want to find the flow rate (q). This channel has a roughness of 0.014, flow area of 25 ft2, hydraulic radius of 35 ft and a slope of 0.002 ft/ft. You would input mannings(x,0.014,25,35,0.002) and it will give you a flow rate of 1273.19 cfs:



Assuming these were in SI units you could simply multiply by (1/1.49) and you would get 854.49 m3/s.

You can also solve for other variables by indication. Let's say you had all the variables except the roughness which you were solving for, the input would look like this:



You can see you get the same result because you simply manipulated the equation and solved for the other variable. This function is best used in conjunction with my Open Channel Hydraulics program that can store applicable channel flow characteristics and solve for the relevant data. Let me know if you have any issues or you believe I have made a mistake.

Thank You

Brian