Problem with inaccuracy produced in the inverse function equation

Dear Ivan: This is the program version I am using, I hope it is the most recent.

Version 4.4

What am I trying to do?

Basically get a ***speed of sound in fresh water vs water temperature*** table into equations that I can code into C.

The T vs V data in table form is:-

T	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
V	1402	1426	1447	1465	1482	1496	1509	1519	1528	1536	1543	1548	1550	1553	1554	1555	1554	1552	1550	1547	1543

Using graph, I get a good points fit to a quadratic equation and even better to a cubic equation

f(x) = 1.2708e-6*x^3 - 5.0e-4*x^2 + 0.0482*x +14.0276

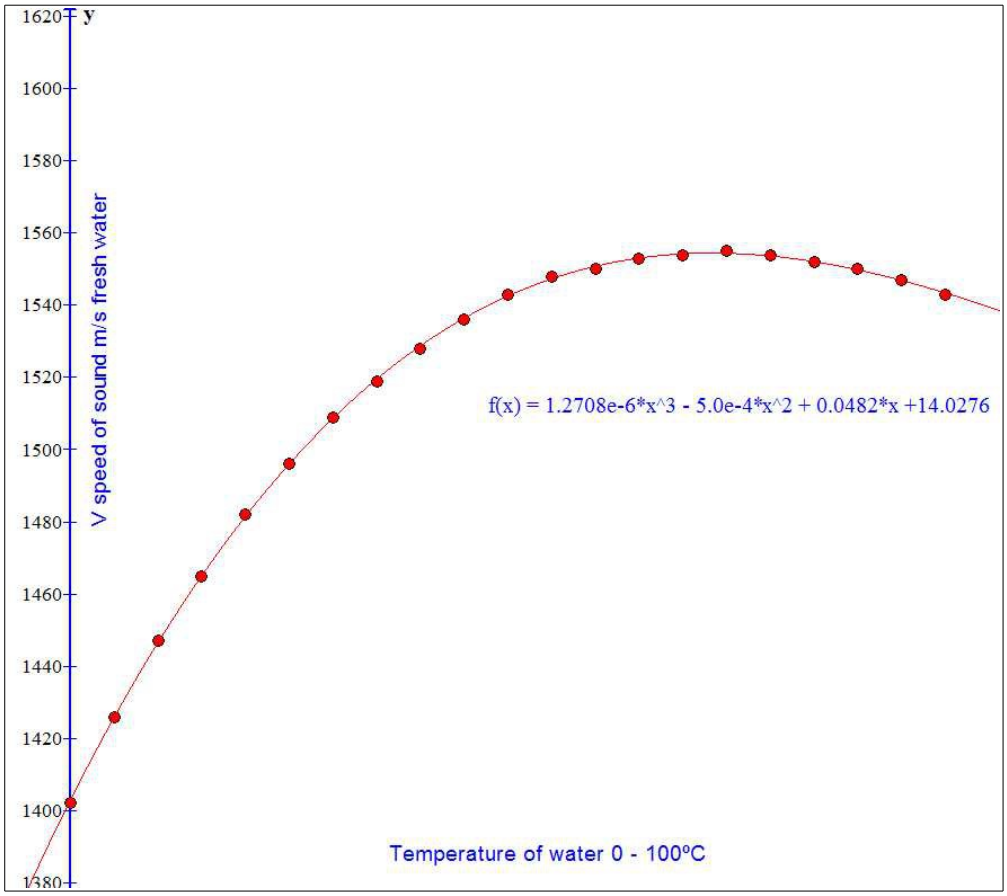
Then I realised I needed th**e inverse equation** because I would be using V to find T

Changing the above equation into the inverse form is beyond my grasp of maths and the whole operation would seem to be very long even if it were possible.
The other option is interchange the data points and see if the new graph is manageable.

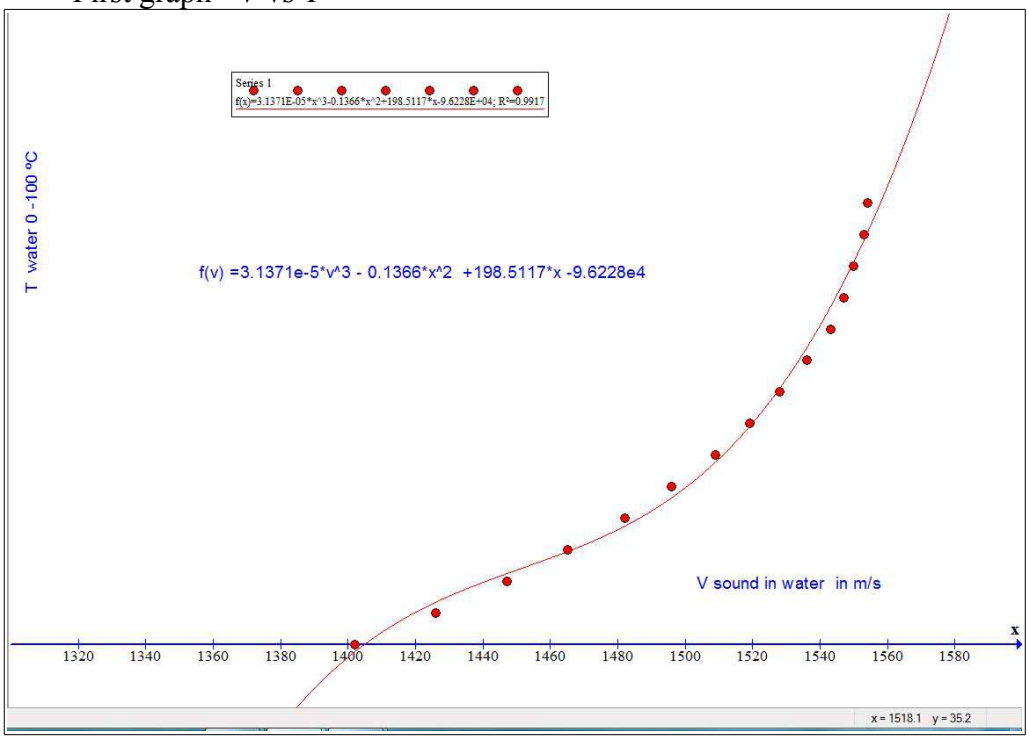
Once again I used the same data to insert points , but with X and Y interchanged

V	1402	1426	1447	1465	1482	1496	1509	1519	1528	1536	1543	1548	1550	1553	1554	1555	1554	1552	1550	1547	1543
T	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

To produce a second graph and equation from the above points.



First graph V vs T



Second graph T vs V

This time the fit is not as good, but near enough to get a half degree T accuracy .
So putting a speed into the 'your graph' generated inverse function equation, to find the temperature produces disappointing results. e.g. v= 1402 gives 31 ºC... should be 0ºC
I am a little puzzled and wonder why

The data points

TABLE1

T	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
v	1402	1426	1447	1465	1482	1496	1509	1519	1528	1536	1543	1548	1550	1553	1554	1555	1554	1552	1550	1547	1543

f(x) = 1.2708e-6*x^3 - 5.0e-4*x^2 + 0.0482*x +14.0276

a good point fit ….an accurate equation

whereas the same table but swapping the x and y columns

TABLE2

V	1402	1426	1447	1465	1482	1496	1509	1519	1528	1536	1543	1548	1550	1553	1554	1555	1554	1552	1550	1547	1543
T	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

f(y) =3.1371e-5*y^3 - 0.1366*y^2 +198.5117*y -9.6228e4

a reasonable point fit but plugging in the sound to get temperature is now wildly inaccurate,

My question is,

Why the loss of accuracy for the inverse equation using TABLE2. ???

I hope the example may be of some use.

As for my C program I can use the found V value and solve by interpolation
For example if I measure 1474m/s then the T is between 15 and 20ºC..

Yours sincerely

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