

# How to make tests for students that are using CAS tool (TI89).

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For pupils 17 to 19 years old

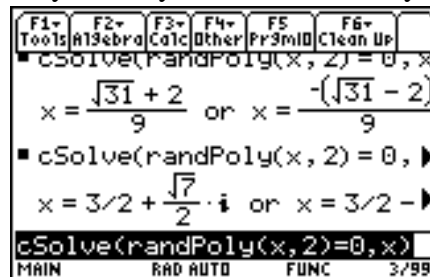
The new way to teach math with CAS , Computer Algebra System, is now growing all over the world.

We have to face a new approach to make young students understand math better.

One way is perhaps to give them the answer of example from real life and let them make the right questions or the right polynomials. It will be some kind of “jeopardy” in math.

Polynomial:

Randomly we makes a quadratic function equal zero and solve it in one order. You get two solutions (zeros). Look at the window. Here from you ask your students if they can suggest one or two functions with these zeros. This is a way to make the students understand that every quadratic function can be at the form  $A(x-x_1)(x-x_2)$



## What polynomial fits to given points?

You are standing with a snowball in a balcony 4 m above the ground and want to hit your friend in the head 1,8 m above the ground 30 m away and you have to pass a 3m high wall 20 m away. Now you of course want to get the equation of the parable the snowball made.

That means we want a polynomial that pass 3 points. (0,4) ; (20,3) and (30,1.8)

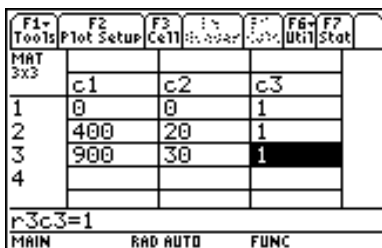
Then the students have to try what order on the polynomial they need and then set up an equation system.

In this case we try with the polynomial

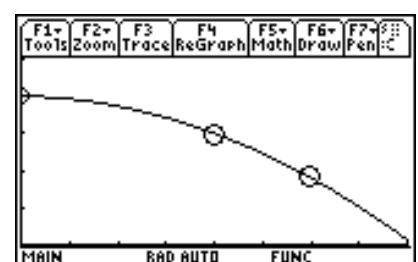
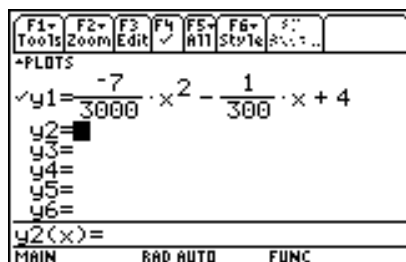
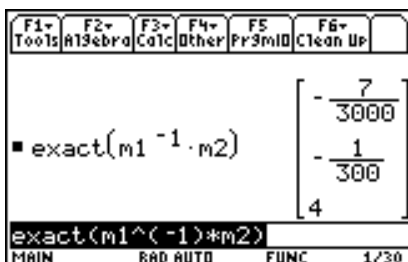
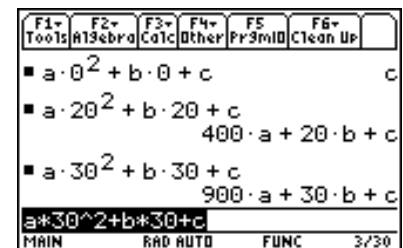
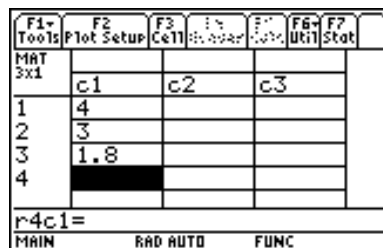
$$y = A x^2 + B x + C$$

Look at the windows to follow the solution

m1



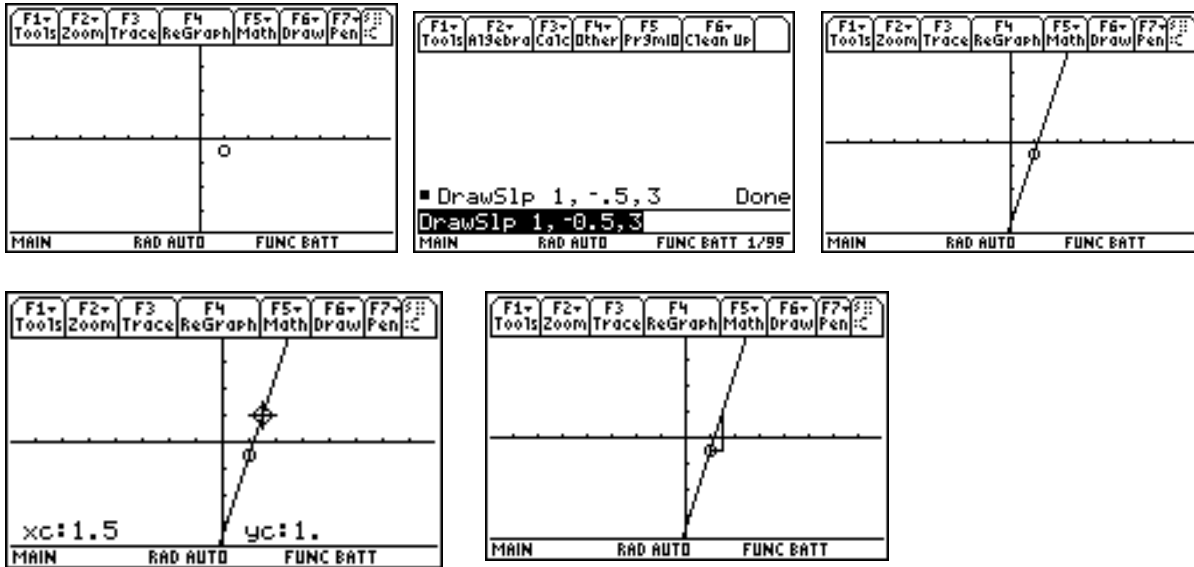
m2



You know that  $f'(1)=3$  and  $f(1) = -0,5$ .

What is approximately  $f(1,5)$ ?

After this the students can calculate  $f(1,5)$  as  $(1,5-1)3=1,5$  and  $-0,5 +1,5= 1.0$

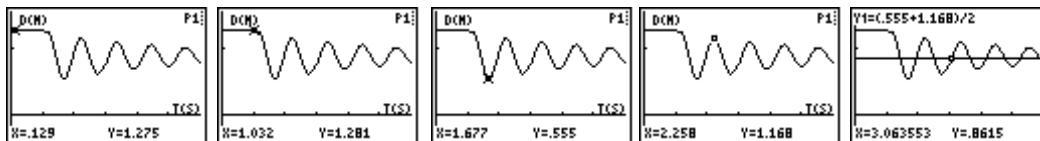


Can you estimate without TI89 a good value of  $\sqrt{26,12}$

when you know that  $\sqrt{25} = 5$  ????????????????

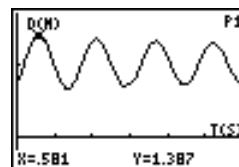
### Bungy Jump

A Coca-Cola tin filled with water tied up with an ordinary rubber band will be the model of a Bungy Jump. By releasing the tin over a CBR placed at the floor we can sample the movement with the graph calculator. The data we received can be analyzed and a lot of calculations can take place.



The students can use this graph as a homework to find the values of A,B,C and D

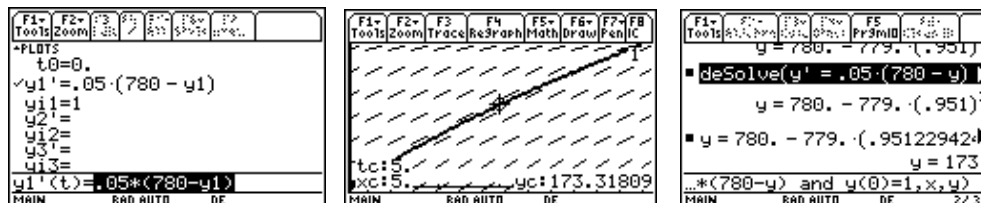
$$y = A \sin(Bx+C)+D$$



### Create and solve differential equations

In a little village with 780 peoples a rumour is spreading with a velocity which is proportional to the number of peoples which do not know the rumour. The constant of proportional is 0,05  
Make a differential equation over the problem and then solve it.

How many people know the rumour after 5 days?



Some mathematics becomes more important because technology requires it.  
Some mathematics becomes less important because technology replaces it.  
Some mathematics becomes possible because technology allows it. Bert Waits