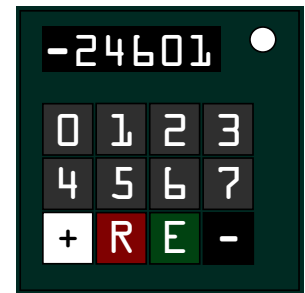


On the Subject of Polynomial Solver

"Where did 8 and 9 go?" You know full well the monster that is 7...

- A Polynomial Solver module will cycle between at least 2 numbered displays, and a blank display.
- The module will generate 5 stages, each increasing the number of displays by one.
- Each display is the result of a standard polynomial function, with the input being the display number (starting at 1 after the blank display for each stage).
- To complete a stage, input the coefficients of the standard polynomial function in order, starting from the one associated with the leading term, going down.
- Correctly completing a stage will generate a new function, and therefore, new displays. Completing all 5 stages will solve the module.
- Incorrectly completing a stage will not generate a new function, and will not generate the next stage. This will also cause a strike.



How to generate the standard polynomial.

There are multiple ways of finding the coefficients of the polynomial. One of which is explained below.

1. Note down the stage number, this is your target degree.
2. Note down all the displays in order.
3. **Preform the following step a number of times equal to the target degree.**
Find the difference between the second and the first number. If you have more numbers, find the difference between the third and second, the fourth and third, and so on. This should leave you with one fewer number than before. Make this your new number list.
4. Take this number and divide it by the factorial of the target degree. This is the coefficient of the term corresponding to the target degree. Note this down as part of your answer.
5. If you have the same number of coefficient as the current stage plus one, enter all of the obtained coefficients for this stage in the same order that they were obtained.
6. Otherwise, do the following:
 - Subtract (the most recent obtained coefficient * x^n) from each display, where x is the display number for that display, and n is the target degree. These are your new display numbers.
 - Decrease the target degree by one. (If it becomes negative, you have gone too far.)
 - Go back to step 3.

What is a standard polynomial.

A standard polynomial is an expression that consists of multiple terms. Terms are added (or subtracted if the coefficient is negative, or non-existent if the coefficient is 0) in decreasing order of the variables' power.

- A term is any part of the expression that is separated by addition or subtraction. It consists of a coefficient and a power of a variable.
- The degree is the power of the highest term

Example: $-4x^4 + 6x^2 - 7x + 2$

This standard polynomial has a degree of 4. The coefficients in order are -4, 0, 6, -7, and 2.

How to input the coefficients.

The module has 8 numbered buttons, a positive button, a negative button, a reset button, and an enter button.

Pressing the positive/negative button set the sign of any following inputs to be positive/negative. The module will remember its current sign between inputs. It is set to positive at the beginning of the bomb.

Pressing a numbered buttons will enter that number into the module. If the current sign is positive, then it will enter the positive version of the selected number, and vice versa for if the current sign is negative. The module will not allow you to input more numbers than required.

The reset button will clear all inputs from submission.

The enter button will submit the inputs. The module will continue to the next stage (or solve if at stage 5) if the inputs are identical to the generated polynomial, and strike otherwise. Inputting too few numbers will strike the module as well. Striking will not reset the module in any way aside from clearing inputs.