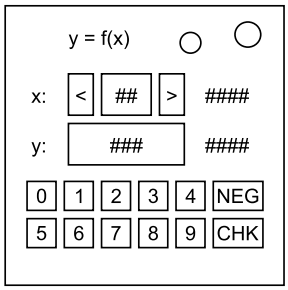
On the Subject of Greek Calculus



The bomb makers are clever. Either the bomb explodes, or they get the answers to their calculus problems. Make your choice. Also, they like Greek letters. Good luck!

- This module contains two screens, labeled x and y, showing data points on a function. It also contains two parameters written to the right of the screens, one blue, one yellow, and a colored LED above the screens.
- The full list of data points can be cycled through using the left and right buttons near the x screen. The data points are sorted in increasing x order, and wrap around.
- Some of the y values and both parameters are encoded using lowercase Greek letters. Their values can be found using Table 1 below.
- There will always be data points with x values equal to each parameter.
- According to the color of the LED, perform the correct calculation using Table 2 below.
- After the answer has been determined, use the number buttons below the screen to input the result. If the result is negative, input the absolute value of the result and then hit the "NEG" button. Push the "CHK" button to check.
- If either the incorrect answer is submitted or more than 9 digits were punched into the module, a strike is given and the input is reset to positive 0.
- **A note on rounding:** If the number to be rounded lies exactly halfway between two integers, always round to the greater integer. (e.g. 3.5 rounds to 4, -9.5 rounds to -9)

Table 1: Greek Letter to Number Conversion Table

Letter	English Name	Number Represented
α	alpha	Number of lit indicators
β	beta	Number of AA batteries
γ	gamma	Number of ports
δ	delta	Last digit of serial number
ε	epsilon	Maximum of non-encoded y values given on this module
ζ	zeta	Number of data points given on this module
η	eta	Minimum of x values given on this module
θ	theta	Minimum of non-encoded y values given on this module
ι	iota	Number of unlit indicators
κ	kappa	Number of digits in the serial number multiplied by the number of letters in the serial number
λ	lambda	The absolute value of the difference between the two parameters on this module
μ	mu	Number of battery holders
ν	nu	Number of D batteries
ξ	xi	Maximum of x values given on this module
ο	omicron	Number of port plates
π	pi	An approximation of the circle constant, π=3
ρ	rho	Number of distinct types of ports
σ	sigma	Sum of all digits in the serial number
τ	tau	An approximation of the circle constant, τ=6
υ	upsilon	Total number of batteries
φ	phi	An approximation of the golden ratio constant, φ=2
χ	chi	The sum of the two parameters on this module
ψ	psi	Total number of indicators
ω	omega	First digit of serial number

Table 2: LED Calculations Table

Green LED:

The goal is to approximate the derivative of the function at the average of the two parameters.

To do so, first find the average of the two parameters, and call it **a**.

Then, within the list, find the data point with the smallest x value that is still strictly greater than **a**. Call this point (**x1, y1**).

Find the data point with the greatest x value that is still strictly less than **a**. Call this point (**x2, y2**).

The answer is (**y1-y2**)/(**x1-x2**) rounded to the nearest integer, where / means division.

Red, Blue or Yellow LED:

The goal is to estimate the integral of the function from the blue parameter to the yellow parameter.

If the parameters are equal, the answer is 0.

Otherwise, starting from the data point with the same x value as the lower parameter and ending at the data point with the same x value as the higher parameter (both inclusive), for each pair of adjacent data points within the list, multiply two numbers:

- the positive difference between their x values, and:
  - If the LED is Red, the y value of the point with the **lower** x value.
  - If the LED is Blue, the y value of the point with the **higher** x value.
  - If the LED is Yellow, the **average** of their y values.

Add all the results together. If the blue parameter is less than the yellow parameter, this sum is the answer. Otherwise, negate this sum to get the answer.

Round the answer to the nearest integer.

Otherwise:

You don't have to do calculus for this one. Just add up the y values of all points with x value between the parameters (inclusive on both sides). This is the answer.