Function Tables

• Objective •

Understand and use calculator functions.
Understand and apply functional relationships.
Enable speedy plotting of graphs.

• • • • • • • • • • • • • • • Explanation of the activity • • • • • • • • • • • • • • •

Use the calculator to calculate the y values for a given function using a set range of values for x.
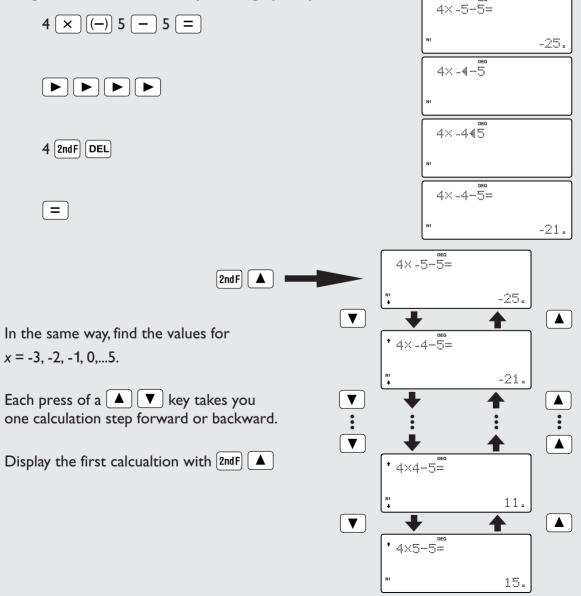Record the values on a table and use them to plot a graph.

• • • • • • • • • • • • • • • • • Using the calculator • • • • • • • • • • • • • • • • •

Calculator functions used: Multiplication, editing, Multi-line Playback

Press the following buttons and then start operation.

x	-5	-4	-3	-2	-1	...	5
y	-25	-21	-17	-13	-9	...	15

ON/C MODE 0

Enter the y values for the function $y = 4x - 5$ using the values from -5 to +5 for x.
Use the calculator's playback function to calculate the functions efficiently. After calculating the values, use them to plot the graph of $y = 4x - 5$.

4 × (−) 5 − 5 =

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2ndF ▲ ➡

In the same way, find the values for
x = -3, -2, -1, 0,...5.

Each press of a ▲ ▼ key takes you
one calculation step forward or backward.

Display the first calcualtion with 2ndF ▲

Return to the calculation for *x* = 5 and redo the calculation for the equation *y* = 4*x* - 3. Add another line to the table and calculate the values of *y* for the new equation. Plot the second graph with the first on the same axis.

What do you notice about the graphs and the numbers in the table?

What do you think will happen if you try another similar equation such as *y* = 4*x* - 1, *y* = 4*x* + 1, or *y* = 4*x* + 4?

Can you explain the number pattern and the picture you have produced?

• • • • • • • • • • • Using the activity in the classroom • • • • • • • • • • •

This activity should be introduced after practicing substitution.

Start the activity as a whole class so the students can gain confidence in using the calculator and see the advantages of calculating first and then recording the results to speed up the process of making the graph table. The students can calculate the *y* values for the second equation themselves and quickly continue with other suggested equations using multi-line playback to go directly from the (*x*, *y*) values to the graph without needing to record the result in a table. This enables the families of graphs to be compared rapidly. Try extending the activity by using graphs with different gradients to establish the parallel nature of the graphs, and then try keeping the intercept constant and varying the gradient.

• • • • • • • • • • • • • • Points for students to discuss • • • • • • • • • • • • • •

The idea of using the playback function as a rapid way to calculate function values can be applied to a wide range of equations including polynomials, trigonometric functions, etc. Students can do calculations in one sequence and then use the playback function to go back through the answers and record or plot them all at once.

Further Ideas

Investigations on graphs can be done more quickly if the playback function is used so each function does not have to be retyped at every entry. Demonstrate this by using the following suggestions:

- Solve a quadratic function such as $ax^2 + bx + c = 0$ for varying values of *a*, *b*, and *c*.

- Use the calculator to generate values of a trigonometric function and enter the results directly onto a graph using the playback function.