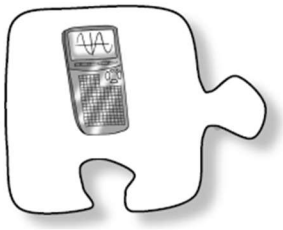
0.2 How can I use my graphing calculator?



Using a Graphing Calculator to Explore a Function

In Algebra 1 you learned that multiple representations such as situations, tables, graphs, and equations and their interconnections are useful for learning about functions. A graphing calculator can be a very useful tool for generating different representations quickly. Today, you will use this tool to explore a function. You will describe your function completely to the class.

1. Your team will use graphing calculators to learn about one of the following functions. Explore using *1-10 Student eTool* (Desmos). You can select these functions from the Desmos eTool at the left. Just click the double arrow located at the bottom right of the graph at the left. Desmos Accessibility

i. $y = 2\sqrt{9 - x} - 4$

ii. $y = \sqrt{100 - x^2}$

iii. $y = 3\sqrt{x + 4} - 6$

iv. $y = 3\sqrt{4 - x} - 3$

v. $y = -2\sqrt{25 - x^2} + 8$

vi. $y = -3\sqrt{x + 9} + 4$

vii. $y = 2\sqrt{25 - x^2} - 1$

viii. $y = \sqrt{4 - x} - 1$

Your Task: Describe your team's function in as much detail as possible. Use your graphing calculator to help you generate a table and a complete graph of your function. Remember that drawing a complete graph means:

- Use graph paper.
- Scale your axes appropriately.
- Label key points.
- Plot points accurately.

As you work, keep your graphing calculators in the middle of your workspace, so that you can compare your screens and all team members can see and discuss your results. Be sure to record what you learn as you explore your function. As a team, you will be preparing a report about your function for the class. Consider the "Discussion Points" below as you work.

Discussion Points

What are the key points on the graph? Where are they exactly?
Can we identify at least five integer inputs that give integer values as outputs?
Are there values of x or y that do not make sense?
How high or low does the graph go?
Did the graphing calculator show an accurate graph?
How can we be sure the graph is complete?

Representations of a Function

- equation
- table
  - 5 integer values (both input and output)
- graph
- key features or interesting points
- minimum x-value
- maximum x-value
- minimum y-value
- maximum y-value

When your team has completed a table and drawn a complete graph, prepare a report for the whole class.

The class will get most out of your presentation if you focus on what was particularly interesting about your function or what you learned. Rather than saying, "*We plugged in a 2 and got a 5,"* consider using statements such as, *"We decided to try an input of 2 because we wanted to know what happened to the left of* $x = 3$*."*

The following sentence starters can help you make a meaningful and interesting presentation.

"At first we were confused by..."

"This makes sense because..."

"We weren't sure about..., so we tried..."

"Something interesting that we noticed about our graph is..."

As you prepare your presentation, your teacher will provide you with construction paper. Reread the task statement of problem 1 (labeled "Your task") and be sure to include all relevant information and ideas on your poster.

MATH NOTES

METHODS AND MEANINGS

Linear Equations

A **linear equation** is an equation that forms a line when it is graphed. This type of equation may be written in several different forms. Although these forms look different, they are equivalent; that is, their graphs are all the same line.

Standard Form: An equation in $ax + by = c$ form, such as $6x - 3y = 18$.

Slope-Intercept Form: An equation in $y = mx + b$ form, such as $y = 2x - 6$.

You can find the **slope** (also known as the **growth factor**) and the ***y*-intercept** of a line in $y = mx + b$ form quickly. For the equation $y = 2x - 6$, the slope is 2, while the *y*-intercept is (0, –6).

$y = 2x - 6$ ← *y-intercept*

slope