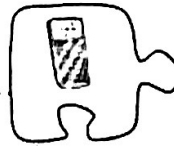# Teacher Notes

1.1.2 How can I use a graphing calculator?

Using a Graphing Calculator to Explore a Function

In previous courses, you learned that multiple representations such as situations, tables, graphs, and equations along with their connections are useful for learning about functions. A graphing calculator is a very useful tool for generating different representations quickly. Today, you will use this tool to explore a function. You will graph and fully describe your function for the class.

1-11.

When working with your team to solve problems in this course, it is important to work effectively with other people. Effective math conversations are a valuable part of the learning process throughout this course. Choose a member of your team to read the Collaborative Learning Expectations out loud.

COLLABORATIVE LEARNING EXPECTATIONS

Working with other students allows you to develop new ways of thinking about mathematics, helps you to learn to communicate about math, and helps you to understand ideas better by having to explain your thinking to others. The following expectations will help you get the most out of working together.

An effective, participating team member will:

- Respect the right of others to learn.

- Help anyone on the team who asks—by giving hints and asking good questions but not by giving answers right away.

- Assist in creating team questions to ask the teacher.

- Justify and explain ideas, instead of giving up when others do not understand.

- Listen carefully to all team members and consider their responses thoroughly.

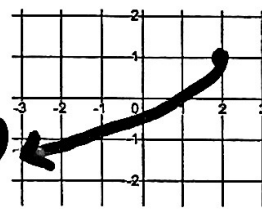- Not leave anyone behind or let anyone work ahead.

- Not talk to another team.

NOTES:

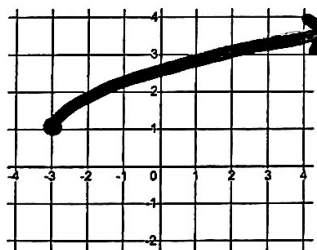Domain: x's

Left → Right

Range: y's

↑ Top

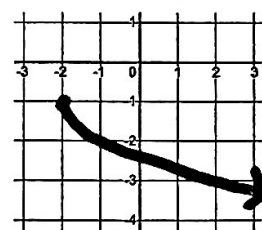↑ Bottom
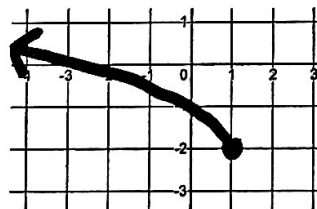
D: $(-\infty, 1]$
R: $[-2, +\infty)$

D: $(-\infty, 2]$
R: $(-\infty, 1]$

D: $[-3, +\infty)$
R: $[1, +\infty)$

D: $[-2, +\infty)$
R: $(-\infty, -1]$
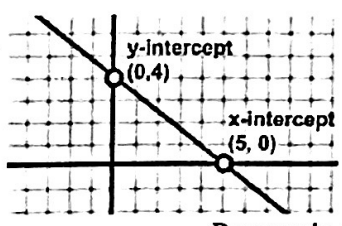
1-13.

Use graphing calculators or *1-13 Student eTool* (Desmos) to learn about one or more of the following functions
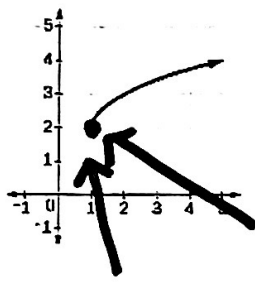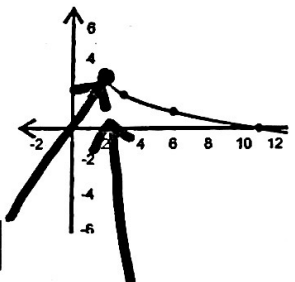
i. $y = 2\sqrt{9 - x} - 4$ ii. $y = \sqrt{100 - x^2}$

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:

- Identify at least five integer inputs that give integer values as outputs.

- Make a table and a complete graph of your function. Use your graphing calculator to help you. Remember that drawing a complete graph means using graph paper, scaling and labeling your axes appropriately, plotting points accurately, and labeling key points.

- Fully describe your graph. Graphs can be described
- using these attributes:

  - shape
    - domain and range
    - endpoints
  - opens upward or downward
    - maximum or minimum points
  - increasing or decreasing
    - continuous or discrete
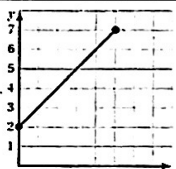 - x- and y-intercepts
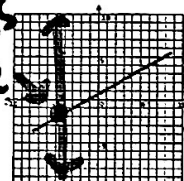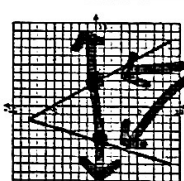   - whether it is a function

NOTES:

X and Y-Intercepts:

Increasing: Decreasing:

Endpoints

Min   Max

Continuous: Discrete:

Function: Not a Function:

1-14.

When your team has drawn a complete graph and fully described its attributes, prepare a report for the whole class.

The class will get the 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."*
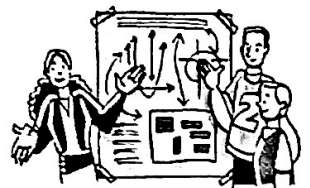
The following sentence starters can help you make a meaningful and interesting presentation.

"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..."

Reread the "Your Task" statement in problem 1-13 and be sure to include all relevant information and ideas in your presentation.