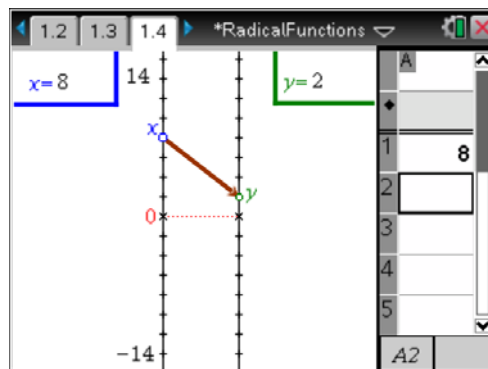




Problem 1 – Domain of a Simple Radical Function

On page 1.4, investigate the function $f_1(x) = \sqrt{x - 4}$ using the nomograph, which works like a function machine. The input to this radical function is represented by point x on the vertical number line to the left. The function output is represented by point y on the number line to the right. The function mapping is represented by the arrow from input to output.



1. Enter the following input values for x and record the outputs:

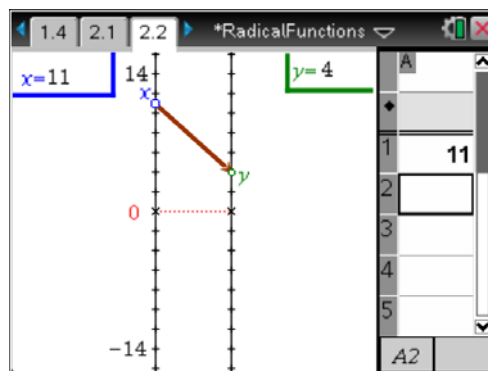
Input	Output
4	→ _____
6	→ _____
8	→ _____
13	→ _____
20	→ _____
29	→ _____

Now drag point x down until the arrow connecting input to output disappears.

2. Near what value of x does the arrow disappear?
3. Why do you think the arrow vanishes?
4. What is the domain of the function $f_1(x) = \sqrt{x - 4}$?

Problem 2 – Guess the Radical

In this problem, there is a different radical function defined. Using the questions below as a guide, determine the rule for this function that maps the inputs to outputs.



5. At what value of x does the arrow vanish?



6. Determine the value of x (the input) that makes the value of $f(x)$ (the output) equal to each number below:

Input		Output
-4	→	_____
-1	→	_____
4	→	_____

7. This function rule involves a square root. What is the rule?

$$f(x) = \underline{\hspace{2cm}}$$

8. What is the domain of the function defined in this problem?

9. Define a radical function with each of these domains:

a. $\{x|x \geq 10\}$

$$g(x) = \underline{\hspace{2cm}}$$

b. $\{x|x \geq 13\}$

$$h(x) = \underline{\hspace{2cm}}$$

c. $\{x|x \leq 29\}$

$$j(x) = \underline{\hspace{2cm}}$$

d. $\{x|x < 10\}$ (Hint: Think fractions.)

$$k(x) = \underline{\hspace{2cm}}$$

Problem 3 – A More Complicated Radical Function

On page 3.2, use the nomograph to investigate the radical function $f(x) = \sqrt{(x-1)(x+4)}$.

10. Enter the following values for x in the spreadsheet on page 3.2, and record the outputs. If there is no output, write “does not exist.”

Input		Output
1	→	_____
-4	→	_____
5	→	_____
-8	→	_____
-2	→	_____



11. There are two inputs at which the arrow disappears or reappears.
What are they?

12. a. Is the function defined for the values of x you listed for Exercise 11?

b. If so, what are their outputs? If not, explain why.

13. What is the domain of the function $f(x) = \sqrt{(x-1)(x+4)}$?

A Radical Extension

Read the directions on page 4.1. On page 4.2, grab point x and drag it up to about 16. As you do so, press `ctrl` + `.` to capture the input-output pairs in the spreadsheet. Notice that Column A is labeled “inputs” and Column B is labeled “outputs.” After you have collected all of your ordered pairs, advance to page 4.4 and look at the scatter plot.

14. Why are there no points in the scatter plot with an x -coordinate less than 4?

15. Why are there no points in the scatter plot with a y -coordinate less than 0?