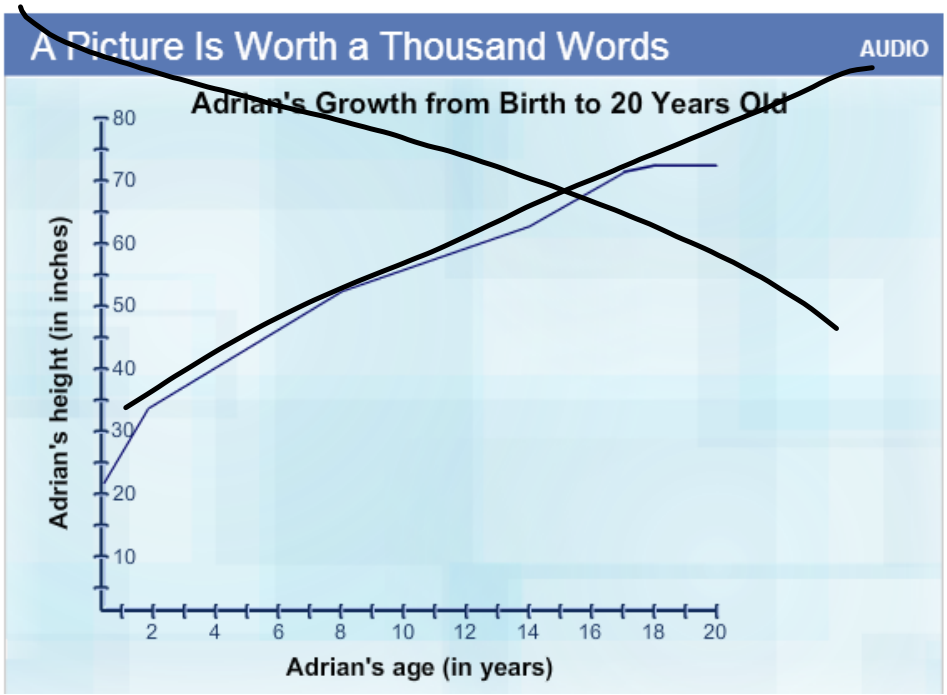
Mapping diagrams, tables, and graphs are all useful ways to display functions. The best way to see how tall someone grows over time is to look at a graph of height as a function of age, or $H(a)$.

The animation shown here demonstrates how the graph of this function can show how Adrian's height changed over many years.



Graphs are determined by ordered pairs, which represent the *x*- and *y*-values of the points on the graph. In an **ordered pair**, there are two values: (*x*, *y*) or (input, output). So, there is one ordered pair for each arrow in a mapping diagram.

Answer the questions below to discover more about mapping diagrams and ordered pairs.

When you know a set of ordered pairs for a function or a relation, you can draw a graph.

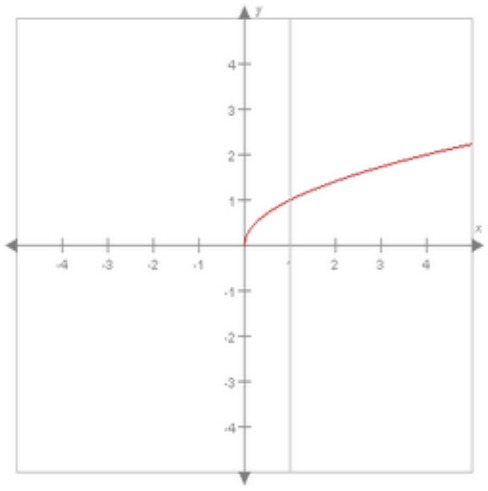
Remember: The horizontal axis on a graph is usually used for the independent variable, or input variable. The vertical axis is used for the dependent variable, or output variable.

In ordered-pair notation, all of the *x*-values make up the domain and all of the *y*-values make up the range.

That means you can estimate the domain and range of a function by looking at its graph. (We say *estimate* because you may not get the whole picture of a function by looking at part of its graph.)

To estimate the domain of a function, or the set of all inputs, look at the *x*-values of the graph.

For example, take a look at the graph of the function *F*(*x*), shown at right. You can tell that 1 is in the domain of *F*(*x*) because there is an ordered pair on the graph with 1 as an *x*-coordinate.



Click for a larger version.

R(*x*) has the following pairs:

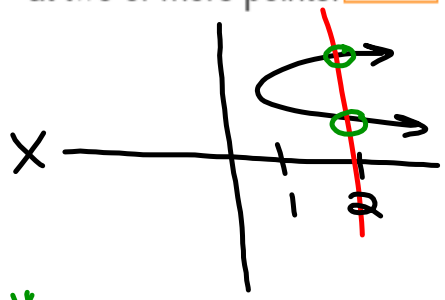
(0, 0), (1, –1), (1, 1), (4, –2), (4, 2)

Looking at the ordered pairs, can you tell if *R*(*x*) is a function? If all of the *x*-values were different, it would be a function. But since two ordered pairs have 1 as their *x*-value and two have 4 as their *x*-value, *R*(*x*) is not a function.

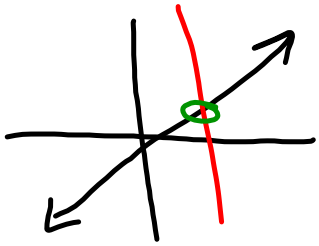
An easy way to tell whether a graph represents a function is to use the vertical line test.

* vertical line test

- A graph represents a function if all vertical lines intersect the graph at only one point.
- A graph does *not* represent a function if any vertical line intersects the graph at two or more points.



* Not a function



* function.