

1.1 Functions



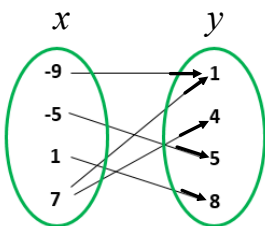
Math Learning Target: " I can graph any relation presented.
I understand the difference between a function and a relation.
I can explain why a relation, presented in *any* form, is a function or not,
without reference to the vertical line test."

Set A **set** is a collection of distinct objects called **elements**.

Relation A **relation** is a relationship between sets of elements (values), typically described as x and y . Each element of one set corresponds to at least one element of another set, to create a set of **ordered pairs** (x, y) .

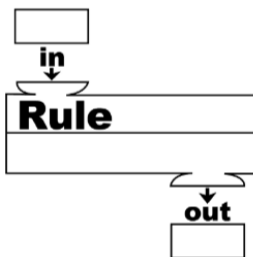
Relations may be expressed as a list, graph, table of values, formula, or a mapping diagram.

Example of a mapping diagram



Function
(loosely stated)

A **function** is a specific type of relation in which each element of the independent variable corresponds to one, and only one, element of the dependent variable.
For every input value, there is a unique output value.

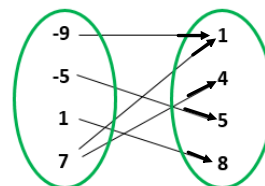


Functions are typically written using the notation $y = f(x)$ (pronounced " f of x ") where the independent variable is x and the dependent variable is y .

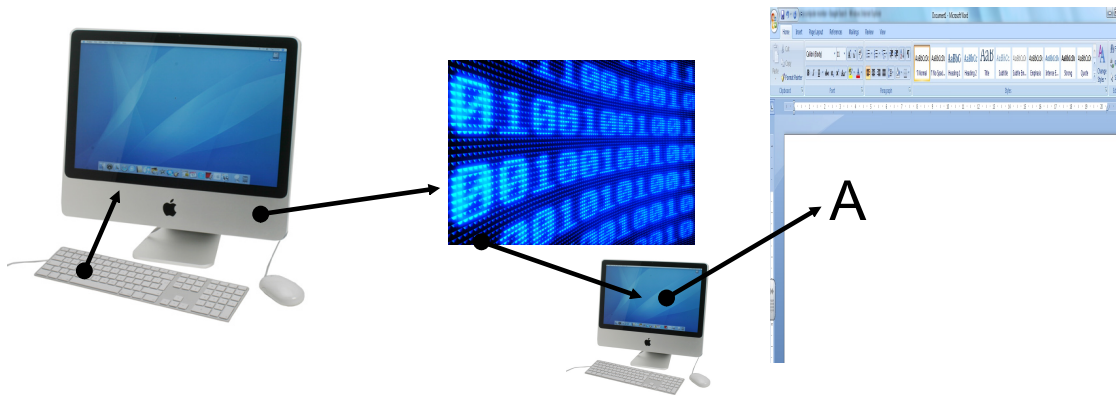
Vertical Line Test

After graphing a relation, it follows that if every vertical line intersects the graph at exactly one point, then it is a function. This is known as the **vertical line test** (VLT).

Does this relation pass the vertical line test?



Some functions are **composite functions**, such as the function that takes one keyboard input, and converts it into one character on the output screen.

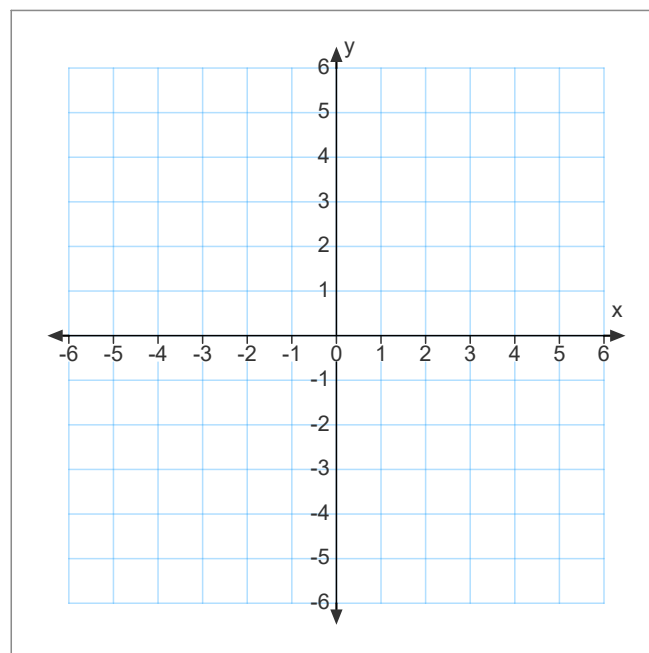


Domain and Range

The complete set of elements of the independent variable is a relation's **domain**, whereas the complete set of elements of its dependent variable is its **range**.

Example

- Graph $x^2 + y^2 = 4$ and $y = (x + 4)^2 - 1$
- State the domain and range for each relation.
- Which one(s), if any, are functions?
Explain *without referring* to the vertical line test.



Function

(more formally stated)

When asked if a relation is a function or not, do not refer to the vertical line test.

- ① Sign and **RETURN** the cover sheet with email address PRINTED.
- ② pp. 11-13 # 2, 3, 4, 5, 7, 8, 9, 10, 11, 14, 15
Do your solutions match the final answers in the back of the text **exactly**, (except where the vertical line test is in the explanation)?

Attachments



billy7.wav