

Evaluating Functions

26/02/2025

What is a function?

input \rightarrow function \rightarrow output

$$f(x) = x + 5$$

$$f(5) = 5 + 5 = 10$$

input

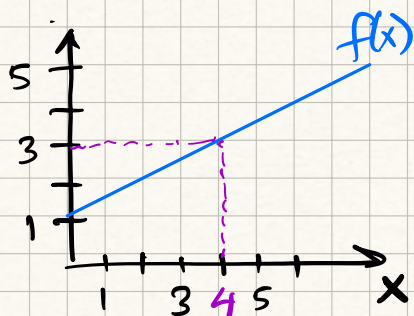
output

What is NOT a function?

$x^2 + y^2 = 4$ not a function b/c more than one output

$$x=1 \Rightarrow y^2=3$$
$$y = \pm\sqrt{3}$$

Evaluate from graph



$$f(4) = 3$$

Summary: In mathematics, a function from set X to a set Y assigns to each element of X , exactly one element of set Y .

Inputs and Outputs of a Function

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Matching an input to a function's output

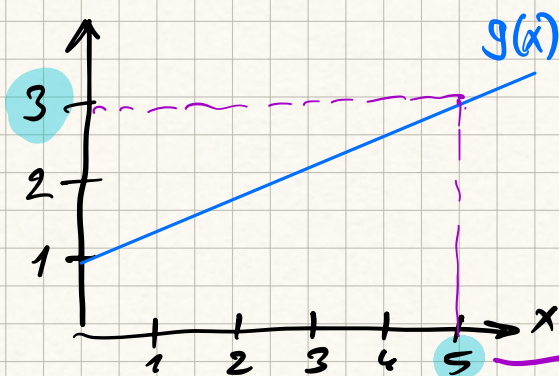
$$f(t) = -2t + 5$$
$$f(t) = 13 \Rightarrow t = ?$$

$$13 = -2t + 5$$

$$2t = -8$$

$$t = -4$$

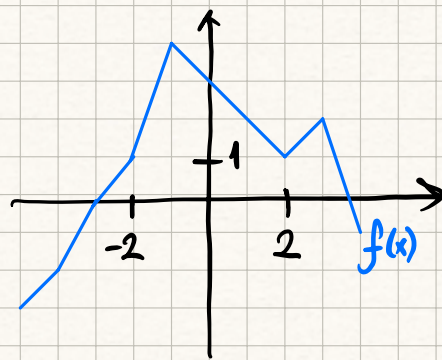
From graph?



$$g(x) = 3 \Rightarrow x = ?$$

$$x = 5$$

Two inputs with the same output



$$f(-2) = -1$$

$$f(2) = 1$$

$$f(-2) = f(2)$$

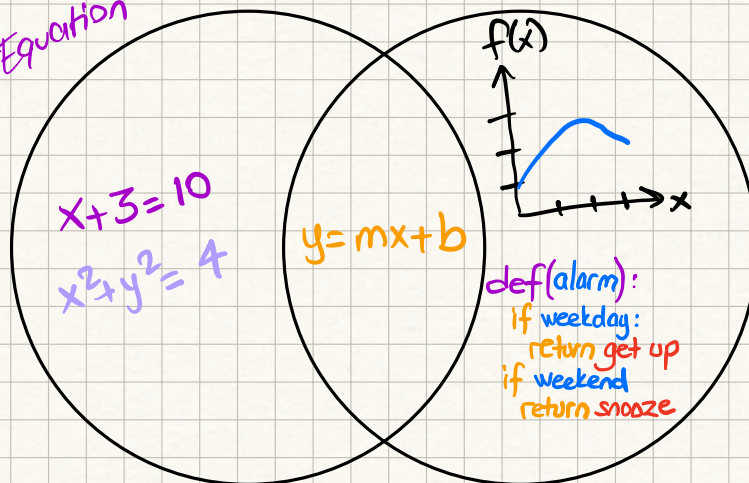
Summary: We can use the graph to match inputs and outputs to each other. A function can have multiple inputs with the same output.

Functions and Equations

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Differences between equations and functions

Equation



Function

$$x+3=10$$

$$x^2+y^2=4$$

$$y=mx+b$$

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def(alarm):
    if weekday:
        return get up
    if weekend:
        return snooze
```

Obtaining a function from an equation

For a given input value b , the function f outputs a value a to satisfy the following equation.

$$4a + 7b = -52$$

Write a formula for $f(b)$ in terms of b .

$$4a = -52 - 7b$$

$$a = -13 - \frac{7}{4}b = f(b)$$

Summary: Not every equation is a function. Not every function is an equation. There are equations who define a function.

Arjun opened up a savings account last year and put an initial sum in it.

Let $M(t)$ denote the account balance M (measured in dollars), t days since it was opened.

What does the statement $M(30) - M(0) = 100$ mean?

- ☐ 30 days after it was opened, the balance of Arjun's account was equal to \$100.
- ☐ Arjun had the initial amount of money in his account 30 days after he opened it.
- ☐ Arjun made a profit of \$100 over the first 30 days since the account was opened.