Evaluating Functions

26/02/2025

What is a function?

input → [function] → output

$f(x) = x + 5$

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

(5: input, 10: output)

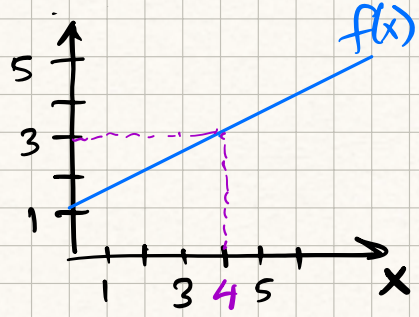
What is NOT a function?

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

$x = 1 \Rightarrow y^2 = 3$

$y = \mp\sqrt{3}$

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

26/02/2025

Matching an input to a function's output

$f(t) = -2t + 5$

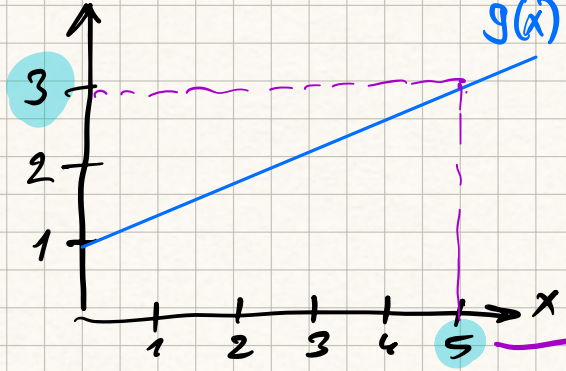
$f(t) = 13 \Rightarrow t = ?$

$13 = -2t + 5$

$2t = -8$

$t = -4$

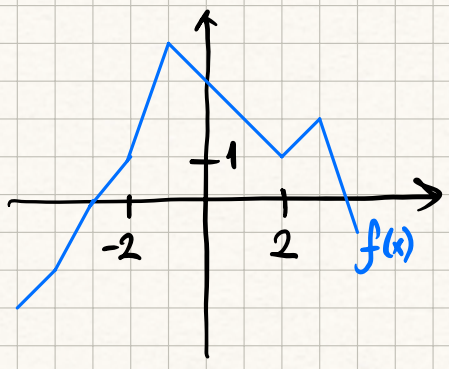
From graph?



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

$x = 5$

Two inputs with the same output



$f(-2) = -1$

$f(2) = 1$

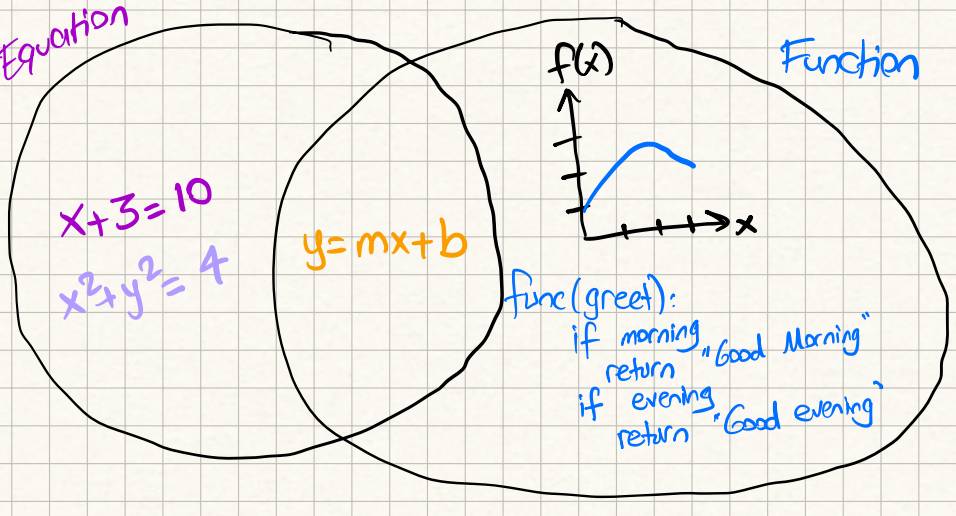
$f(-2) = f(2)$

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

26/02/2025

Differences between equations and functions



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.

Interpreting Function Notation

26/02/2025

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.