

# Functions

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What is a function?

# A function is a rule for producing an output from an input.

- ▶ There must be exactly one output for each input.
- ▶ An input may not have more than one output.
- ▶ An input must have one output.
- ▶ The *domain* of a function is the set of all possible inputs to the function.
- ▶ The *codomain* of a function is a set that contains all possible outputs of the function.
- ▶ The *image* of a function is the set of all possible outputs of the function.
- ▶ Two different inputs *may* have the same output.
- ▶ There *may* be elements in the codomain that are not the output of any input.

# What can you do with a function?

- ▶ *Apply* the function to an element of the domain to get an element of the codomain
- ▶ *Graph* the function (if its domain and codomain are both sets of numbers)
- ▶ *Compose* the function with another function
- ▶ *Invert* the function (if it's invertible) to get another function
- ▶ *Differentiate* the function to obtain another function
- ▶ *Integrate* the function to obtain another function