함수
(Function)

▸ Start

Start

Definition (Function)

Start

Definition (Function)

A **function** f

Start

Definition (Function)

A **function** f is

Start

Definition (Function)

A **function** f is a rule

▸ Start

Definition (Function)

A **function** f is a rule that assigns to each element x

Start

Definition (Function)

A **function** f is a rule that assigns to each element x in a set D

Start

Definition (Function)

A **function** f is a rule that assigns to each element x in a set D exactly one element,

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Definition (Function)

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Definition (Function)

A **function** f is a rule that assigns to each element x in a set D exactly one element, called $f(x)$, in a set E.

▸ Start

Definition (Function)

A **function** f is a rule that assigns to each element x in a set D exactly one element, called $f(x)$, in a set E.

Definition (Domain, Value of f at x, Range, Independent variable)

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Definition (Domain, Value of f at x, Range, Independent variable)

The set D is called the **domain**

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Definition (Independent variable, Dependent variable)

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Definition (Independent variable, Dependent variable)

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Function

Start

Start

A function f

Start

A function f from X

▸ Start

A function f from X to Y

▸ Start

A function f from X to Y is a subset

▸ Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject

▸ Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element

▸ Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X is the first component

▸ Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X is the first component of one and only one

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X is the first component of one and only one ordered pair

▸ Start

A function f from X to Y is a subset of the Cartesian product $X \times Y$ subject to the following condition:
Every element of X is the first component of one and only one ordered pair in the subset.

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X is the first component of one and only one ordered pair in the subset.
In other words,

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
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In other words, for every x

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Every element of X is the first component of one and only one ordered pair in the subset.
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A function f from X to Y is a subset of the Cartesian product $X \times Y$ subject to the following condition:
Every element of X is the first component of one and only one ordered pair in the subset.
In other words, for every x in X there is

Start

A function f from X to Y is a subset of the Cartesian product X $\times$ Y subject to the following condition:
Every element of X is the first component of one and only one ordered pair in the subset.
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home

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▶ Start

▸ Start

$X \times Y$

Start

$X \times Y =$

Start

$X \times Y = \{$

▸ Start

$$X \times Y = \{(x, y)$$

Start

$$X \times Y = \{(x, y)|$$

Start

$$X \times Y = \{(x, y) | x \in X,$$

Start

$$X \times Y = \{(x, y) | x \in X, y \in Y\}$$

Start

$$X \times Y = \{(x, y) | x \in X, y \in Y\} :$$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product

Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

Function

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function

Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \\ \\ \end{cases}$$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset \\ \\ \end{cases}$$

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$$\begin{cases} f \subset X \times Y \\ \\ \end{cases}$$

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$$\begin{cases} f \subset X \times Y \\ \forall x \in X \end{cases}$$

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$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists ! y \in Y \end{cases}$$

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$$\begin{cases} f \subset X \times Y \\ \forall x \in X, \ \exists! y \in Y \text{ s.t. } (x, y) \in f \end{cases}$$

Function

▸ Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

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$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in \mathrm{X} \\ \end{cases} \end{cases}$$

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$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \end{cases} \end{cases}$$

Function

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$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \end{cases} \end{cases}$$

Start

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▸ Start

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▸ Start

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f

Start

$X \times Y = \{(x,y)|x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

f :

Start

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f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X$$

▸ Start

$\mathrm{X} \times \mathrm{Y} = \{(x,y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \rightarrow$$

Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \to \mathrm{Y},$$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists ! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X$$

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y, X \xrightarrow{f}$$

▸ Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \to \mathrm{Y}, \mathrm{X} \xrightarrow{f} \mathrm{Y}$$

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists ! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Start

$\mathrm{X} \times \mathrm{Y} = \{(x,y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \to \mathrm{Y},\ \mathrm{X} \xrightarrow{f} \mathrm{Y}$$

X Domain

Y

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

f

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

f :

▸ Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$f : x$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow$$

Start

$\mathrm{X} \times \mathrm{Y} = \{(x, y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \to \mathrm{Y}, \mathrm{X} \xrightarrow{f} \mathrm{Y}$$

X Domain

Y Codomain

$$f : x \longrightarrow y,$$

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x$$

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f}$$

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x \xrightarrow{f} y,$$

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y$$

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$f : X \to Y, X \xrightarrow{f} Y$

X Domain

Y Codomain

$f : x \longrightarrow y, x \xrightarrow{f} y, y =$

▸ Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f$$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f($$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists ! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x$$

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x \xrightarrow{f} y,\ y = f(x)$$

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$$

$f(x)$

▸ Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \end{cases} \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$$

$f(x)$ The value

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$f : X \to Y, X \xrightarrow{f} Y$

X Domain

Y Codomain

$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$

$f(x)$ The value of a function f

▸ Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y, X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$$

$f(x)$ The value of a function f at x

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x \xrightarrow{f} y,\ y = f(x)$$

$f(x)$ The value of a function f at x

x

Start

$\mathrm{X} \times \mathrm{Y} = \{(x,y) | x \in \mathrm{X}, y \in \mathrm{Y}\}$: The Cartesian product $\mathrm{X} \times \mathrm{Y}$

f is a function from X to Y.

$$\begin{cases} f \subset \mathrm{X} \times \mathrm{Y} \\ \forall x \in \mathrm{X},\ \exists! y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \begin{cases} \forall x \in \mathrm{X},\ \exists y \in \mathrm{Y} \text{ s.t. } (x,y) \in f \\ (x,y_1) \in f \text{ and } (x,y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : \mathrm{X} \to \mathrm{Y}, \mathrm{X} \xrightarrow{f} \mathrm{Y}$$

X Domain

Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$$

$f(x)$ The value of a function f at x

x The independent variable

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x \xrightarrow{f} y,\ y = f(x)$$

$f(x)$ The value of a function f at x

x The independent variable

y

Start

$X \times Y = \{(x, y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

$$\begin{cases} f \subset X \times Y \\ \forall x \in X,\ \exists! y \in Y \text{ s.t. } (x, y) \in f \begin{cases} \forall x \in X,\ \exists y \in Y \text{ s.t. } (x, y) \in f \\ (x, y_1) \in f \text{ and } (x, y_2) \in f \Rightarrow y_1 = y_2 \end{cases} \end{cases}$$

$$f : X \to Y,\ X \xrightarrow{f} Y$$

X Domain

Y Codomain

$$f : x \longrightarrow y,\ x \xrightarrow{f} y,\ y = f(x)$$

$f(x)$ The value of a function f at x

x The independent variable

y The dependent variable

Function

Start

$X \times Y = \{(x,y) | x \in X, y \in Y\}$: The Cartesian product $X \times Y$

f is a function from X to Y.

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Y Codomain

$$f : x \longrightarrow y, x \xrightarrow{f} y, y = f(x)$$

$f(x)$ The value of a function f at x

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