

Functions

Functions are a special type of relation.

$$f: A \rightarrow B$$

We write " $y = f(x)$ " instead of

" $x f y$."

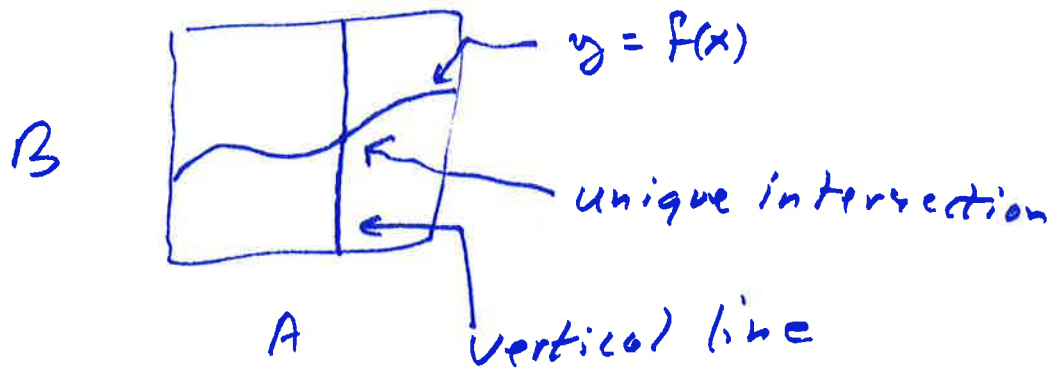
Property of the relations that are functions:

For each $x \in A$ there is a unique element $y \in B$

for which $y = f(x)$.

Graphs of functions?

The graph of any function satisfies the Vertical Line Test:



Some terminology about functions

Domain: A

Target: B

Range: $\{y \mid \text{there is } x \in A$

for which $y = f(x)\}$ $\subseteq B$

The function $f: A \rightarrow B$ is

"1-1" or "injective" if

$$y = f(x_1) \text{ and } y = f(x_2)$$

implies $x_1 = x_2$

"onto" or "surjective" if

the target of f

equals the range of f

a "bijection," a "1-1 correspondence,"

or "1-1 and onto" if

it is both 1-1 and onto

Bijections and Cardinality

Sets A and B are "in 1-1 correspondence" if there is a function $f: A \rightarrow B$ that is a 1-1 correspondence.

This is an equivalence relation.

Homework

3.1: 1, 3, 14, 16, 18, 19, 20, 24;

3.2: 1, 2, 3, 11, 12, 22, 23, 24;

3.3: 2, 3, 12.

|| NEXT TIME:

We begin Chapter 5.