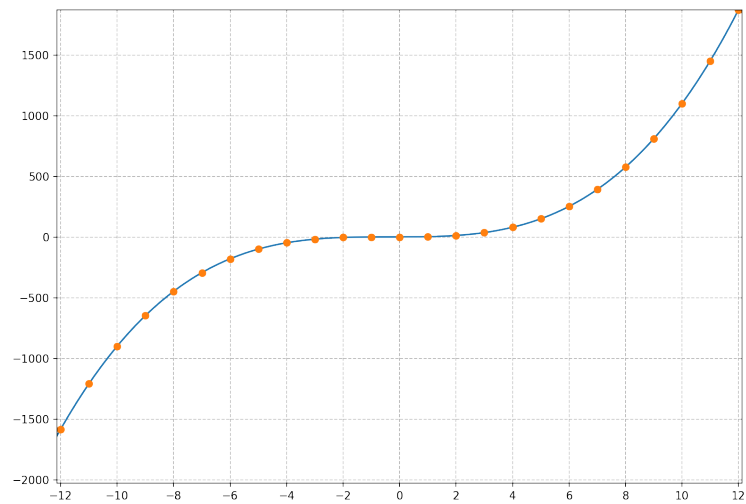


Functions (Classes)

1. Function Classes (1)

Classes of Function

The following mapping is given: $f : A \rightarrow B$ with $x \mapsto x^3 + x^2 + 1$ for all $x \in A$. Its graph is plotted below for values between $-12 \leq x \leq 12$:



Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B .

- (a) For $A = \mathbb{R}, B = \mathbb{R}$ the mapping is

no function
a function
an injection
a surjection
a bijection ✓

.

- (b) For $A = \mathbb{Z}, B = \mathbb{R}$ the mapping is

no function
an injection ✓
a surjection
a bijection

.

- (c) For $A = \mathbb{R}, B = \mathbb{Z}$ the mapping is

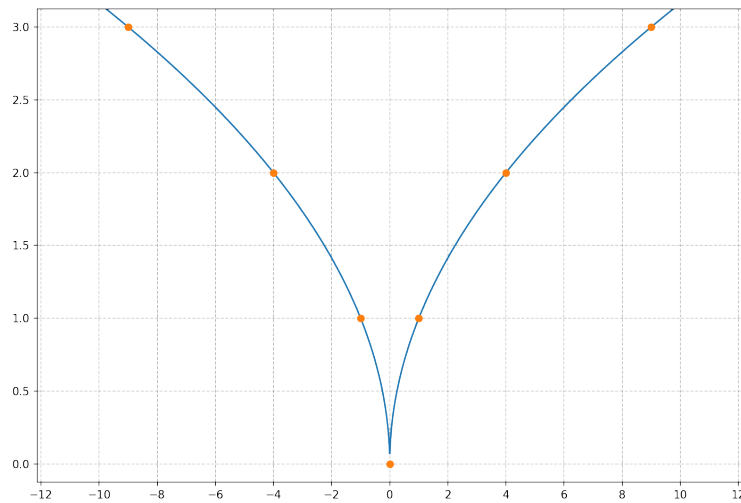
no function ✓
a function
an injection
a surjection
a bijection

.

2. Function Classes (2)

Classes of Function

The following mapping is given: $f : A \rightarrow B$ with $x \mapsto \sqrt{|x|}$ for all $x \in A$. Its graph is plotted below for values between $-12 \leq x \leq 12$:



Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B .

(a) For $A = \mathbb{R}, B = \mathbb{R}_0^+$ the mapping is

no function
a function
an injection
a surjection ✓
a bijection

(b) For $A = \mathbb{Z}, B = \mathbb{R}^+$ the mapping is ✓

no function
an injection
a surjection
a bijection

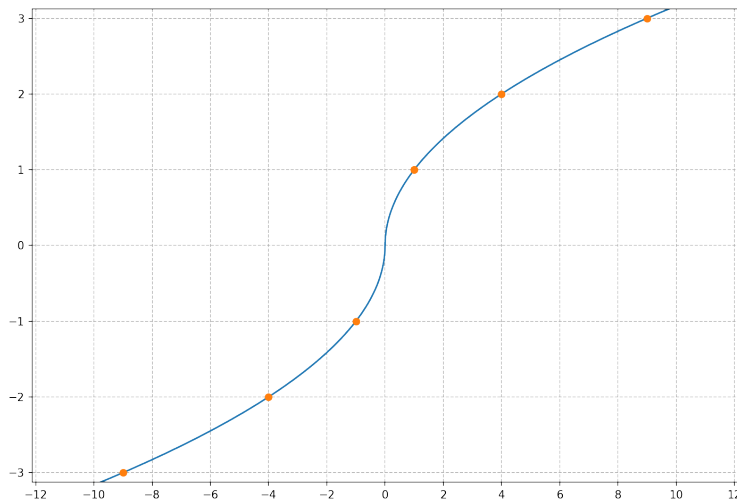
(c) For $A = \mathbb{R}^+, B = \mathbb{R}^+$ the mapping is

no function
a function
an injection
a surjection
a bijection ✓

3. Function Classes (3)

Classes of Function

The following mapping is given: $f : A \rightarrow B$ with $x \mapsto \frac{x}{|x|} \cdot \sqrt{|x|}$ for all $x \in A$.
 Its graph is plotted below for values between $-12 \leq x \leq 12$:



Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B .

(a) For $A = \mathbb{R} \setminus \{0\}, B = \mathbb{R} \setminus \{0\}$ the mapping is

no function
a function
an injection
a surjection
a bijection ✓

(b) For $A = \mathbb{Z} \setminus \{0\}, B = \mathbb{R} \setminus \{0\}$ the mapping is

no function
an injection ✓
a surjection
a bijection

(c) For $A = \mathbb{N}, B = \mathbb{R} \setminus \{0\}$ the mapping is

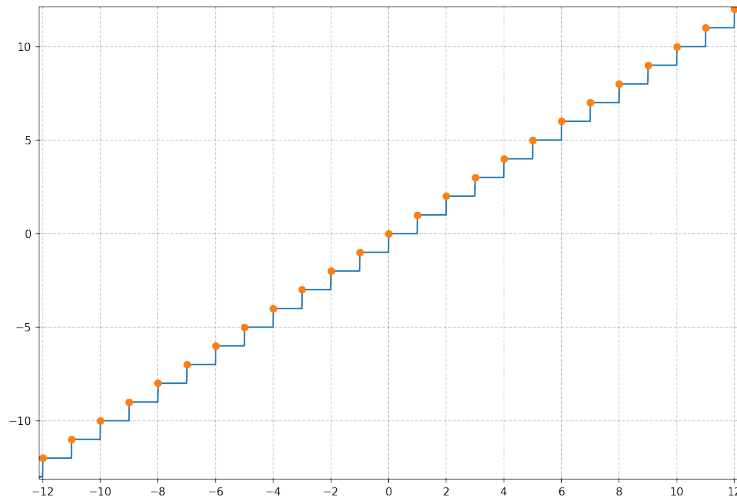
no function
a function
an injection ✓
a surjection
a bijection

4. Function Classes (4)

Classes of Function

The following mapping is given: $f : A \rightarrow B$ with $x \mapsto f(x) = \lfloor x \rfloor$, i.e. the largest number $\leq x$ for all $x \in A$.

Its graph is plotted below for values between $-12 \leq x \leq 12$:



Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B .

- (a) For $A = \mathbb{R}, B = \mathbb{R}$ the mapping is
- | |
|--------------|
| no function |
| a function ✓ |
| an injection |
| a surjection |
| a bijection |

- (b) For $A = \mathbb{R}, B = \mathbb{Z}$ the mapping is
- | |
|----------------|
| no function |
| an injection |
| a surjection ✓ |
| a bijection |

- (c) For $A = \mathbb{N}, B = \mathbb{Z}$ the mapping is
- | |
|----------------|
| no function |
| a function |
| an injection ✓ |
| a surjection |
| a bijection |