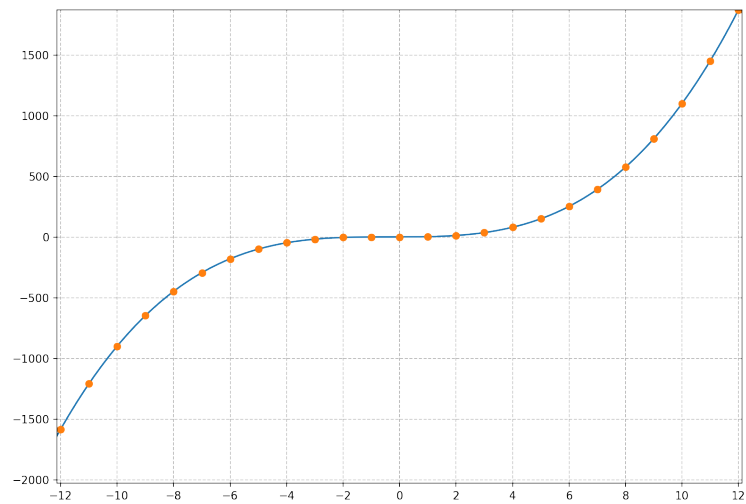# Functions (Classes)

1. **Function Classes (1)**

   Classes of Function

   The following mapping is given: $f : A \to B$ with $x \mapsto x^3 + x^2 + 1$ for all $x \in A$.
   Its graph ist plotte 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: $f : A \to B$ with $x \mapsto \sqrt{|x|}$ for all $x \in A$.
   Its graph ist plotte below for values between $-12 \le x \le 12$:
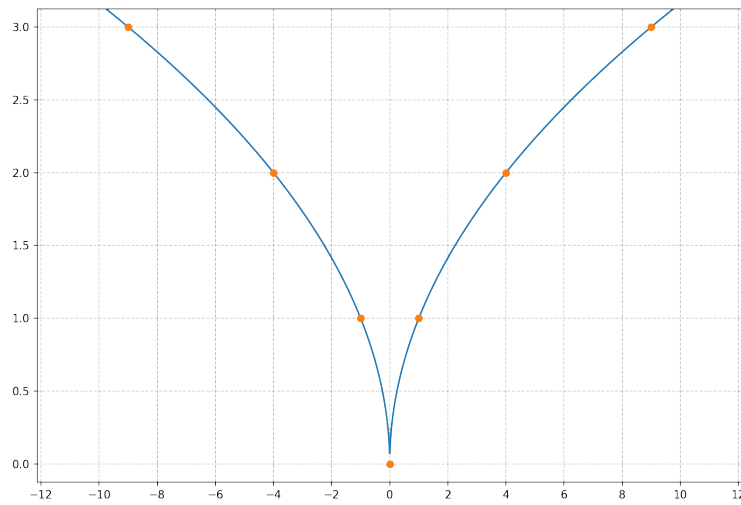
   Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B.

   (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: $f : A \to B$ with $x \mapsto \frac{x}{|x|} \cdot \sqrt{|x|}$ for all $x \in A$.
   Its graph ist plotte below for values between $-12 \le x \le 12$:
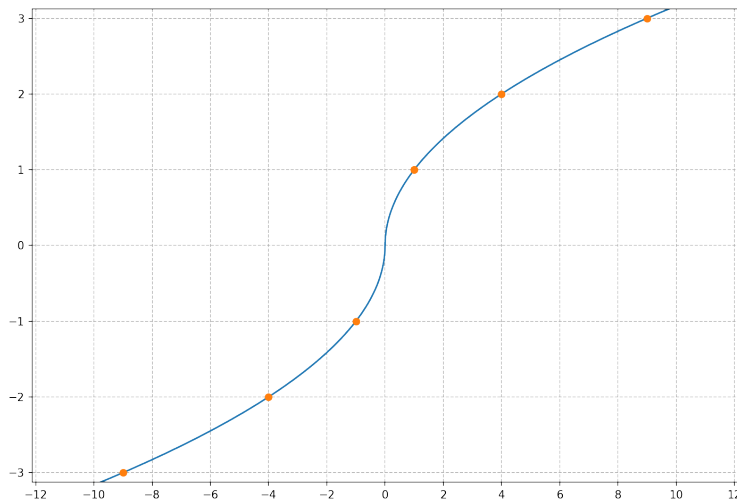
   Use the graph to decide whether the mapping represents a function and to which class of functions it belongs depending on sets A and B.

   (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
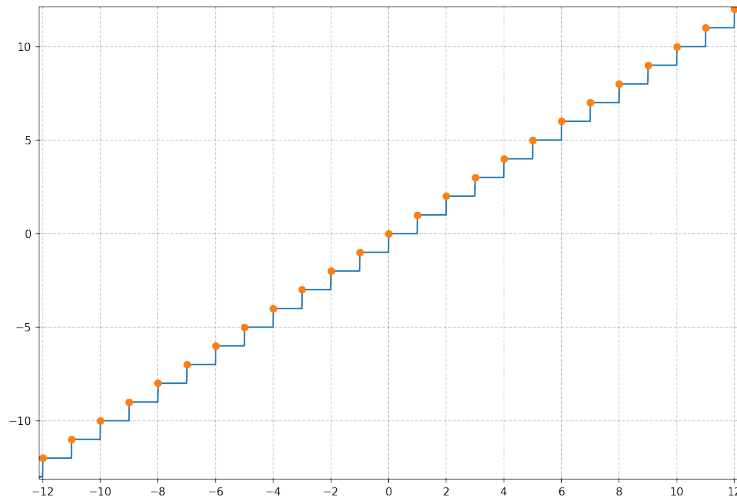
no function
a function
an injection ✓
a surjection
a bijection

4. **Function Classes (4)**

Classes of Function

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

Its graph ist plotte 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

.