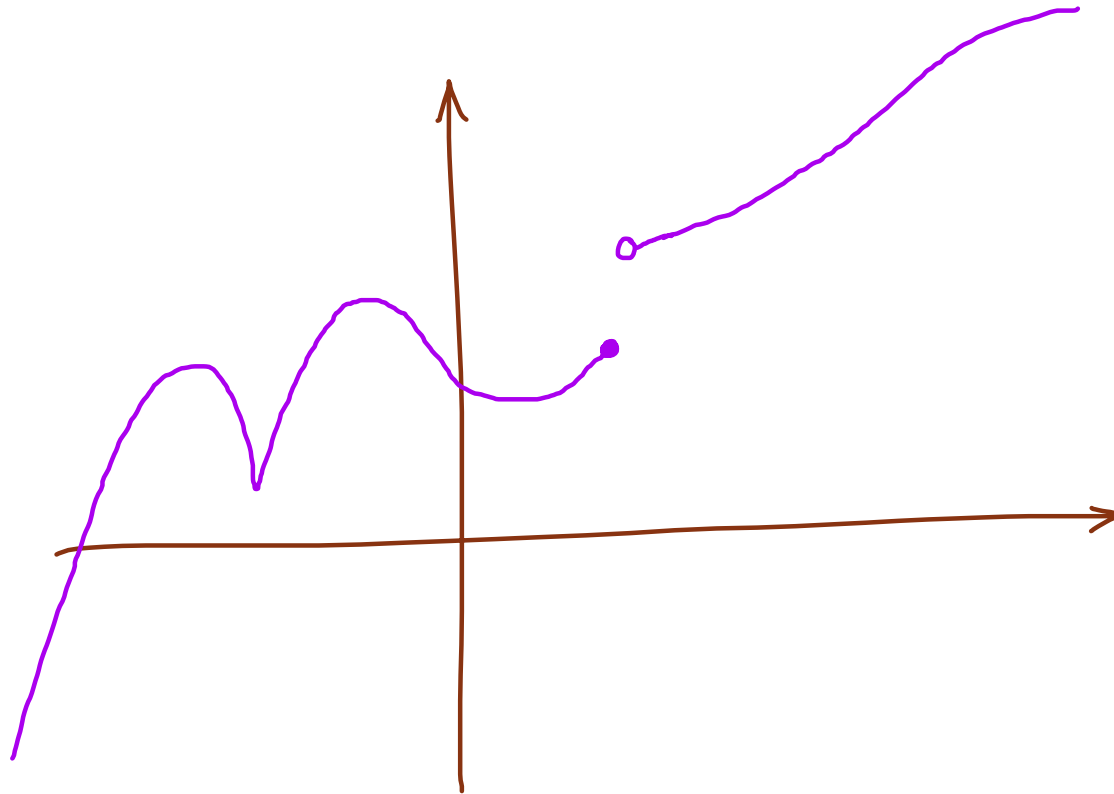


FUNCTIONS

Is this a function?



ONTO

Which of the following functions are onto?

1. $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = x^2 - 4x + 5$

2. $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = \sin(x)$

3. $f: \mathbb{R} \rightarrow \mathbb{Z}, f(x) = \lceil x \rceil$

4. $f: \mathbb{Z} \rightarrow \mathbb{Z}, f(x) = 2x$

5. $f: \{\text{people}\} \rightarrow \{A, \dots, Z\}, f(x) = \text{first initial of } x.$

When a function is not onto, describe the image.

ONE-TO-ONE

Which of the following functions are one-to-one?

1. $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = x^2 - 4x + 5$

2. $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = \sin(x)$

3. $f: \mathbb{R} \rightarrow \mathbb{Z}, f(x) = \lceil x \rceil$

4. $f: \mathbb{Z} \rightarrow \mathbb{Z}, f(x) = 2x$

5. $f: \{\text{people}\} \rightarrow \{A, \dots, Z\}, f(x) = \text{first initial of } x.$

When a function is not one-to-one, find the largest domain on which it is.

IDENTITY FUNCTION

Let A be a set. The identity function is always...

- A. one-to-one
- B. onto
- C. both
- D. neither

INVERSES

Find the inverses of the following functions.

$$f(x) = x^2$$

$$f(x) = 3x + 7$$

$$f(x) = \frac{x}{x-1}$$

$$f(x) = \ln(2x - 5)$$

COMPOSITION

Say $f(x) = \lceil x \rceil$ and $g(x) = \sqrt{x}$.

What is the domain of $f \circ g$?

What is $f \circ g(10)$?

Find the inverse of $f(x) = (2x+8)^3$ and check $f \circ f^{-1}$ is the identity.