

Why use this resource?

This resource is intended to help students to clarify their understanding of the behaviour of functions and inverses by thinking about visualising or sketching some examples. The discussion will help students with the nuances between their intuitive understanding of inverses as opposites and a full understanding of an inverse. The GeoGebra files in the [Reflections](#) can be used to help make these ideas more precise. It could prompt a discussion of how we can differentiate inverse functions.

Preparation

Students will benefit from sketching so mini-whiteboards would be useful. A “show-me” approach can be taken also.

Possible approaches

Display the questions.

Approach 1:

- Ask students individually to quickly write their answers to fill the gaps as a show-me exercise either one by one or all three together. Don't comment on whether their ideas are correct or incorrect.
- Ask students to compare their answers with a partner or small group, discuss differences and decide on a collective response.
- Reveal the “Some functions” toggle and ask them to discuss whether this changes their decisions.
- Show the GeoGebra applets and discuss these as a class, checking the understanding different groups have come to.

Approach 2: Ask students to think about how to fill the gaps. After a couple of minutes they should pair up, discuss their ideas and make some sketches which could convince someone else they are correct. Have students group up in 4s or 6s to discuss their responses and write similar statements about decreasing functions.

Show the GeoGebra applet(s) and ask “What can you now say about the gradients of functions that have inverses?” Ask groups to think about relationships between functions and their inverses. Display the “Things to think about”.

Key questions

- What does an inverse function look like geometrically? Can you describe the transformation?
- What does an inverse function look like algebraically?
- How do we define a function?
- Does this suggest a way of differentiating an inverse function?

Possible support

Using the “Some functions” toggle could be helpful if students are struggling to think of functions to sketch.

Possible extension

How could we use this with exponential/logarithmic or trigonometric functions?