Invertibles

Teacher notes

Why use this resource?

By using this resource students can develop fluency in algebraically inverting functions, whilst at the same time having to think about the significance of domain and range.

This resource can be used as an introduction to the relationship between the graphs of a function and its inverse. It also touches on self-inverse functions.

Preparation

You might choose to use the resource Making inverse functions as a preliminary task.

Sets of cards will need to be cut out, including blanks to write on — you might choose to laminate cards so that they can be written on with dry-wipe markers.

You might also choose to print copies of the graphs page.

Possible approaches

This activity lends itself to working in pairs. Students match up the first group of functions — quadratics and square roots. You can choose to either show them the graphs or ask them to sketch all the graphs for themselves. (The separate graphs page is designed for use with the cut-out cards. To see the graphs on the interactive page, drag downwards the bottom edge of the grey card sort area.)

You might use the interactive card sort on the Problem section to draw together ideas in a plenary discussion, thinking about lessons learnt and potential pitfalls. Make sure students have understood the importance of the domain as part of the definition of a function. You can use functions b and c to emphasise this, pointing out that they have very different inverse functions.

Then move on to the second group of functions. These may require rewriting to understand what type of curve they are and to invert them algebraically.

Alternatively, give students all the function cards at once and let them sort into groups first as a way of discussing types of functions.

Key questions

Algebra:

- How can we rewrite this with x as the subject?
- How does the domain of the function affect its inverse?
- What do you notice about the domain and range of the paired functions?

Graph sketching:

- What do you expect the graph of this function to look like?
- How does the specified domain change the graph?
- Can you see this as a transformation of a more familiar graph?
- What do you notice about the graphs of paired functions?

Possible support

Graphing software such as Desmos could be used to do the graph sketching. Type for instance, x^2-2{x>=0}

Possible extension

Think a bit more deeply about domains and ranges:

- If $m(x) = x^2 - 2, \ \ 1 \leq x \leq 2$, what is its inverse (including its domain)?
- If $n(x) = x^2 - 2, \ \ -2 \leq x \leq -1$, what is $n^{-1}(x)$?