Forming functions — defining domains

Teacher notes

Why use this resource?

This resource has been designed to help students understand that domain matters! The task illustrates the importance of domain in defining a function, and shows that restricting the domain may or may not restrict the range. The idea of restricting the domain without restricting the range will help prepare students to think about inverse functions.

Preparation

For more details about functions and function notation, see What relation are you? and Piece it together.

Possible approach

Students can usefully work in pairs or small groups, taking one rule at a time, sketching and writing down domains. Ask them to check one another's work to ensure they have excluded all points where a rule is be undefined.

Collect some ideas from around the class before moving them on to think about the further pair of questions about the largest possible domain and range. You might need to check that they have really understood what the last question is asking.

The significance of these last questions may not become apparent until students start to work on inverse functions, perhaps using Making inverse functions or Invertibles.

Key questions

- What do graphs of the four rules have in common and how do they differ?
- What difference does it make to the range if we choose integers rather than real numbers as the domain?
- Which values of x may be troublesome and why?
- Which rules are one-to-one and which are many-to-one?

Possible support

Encourage students to sketch the graphs of the four rules before thinking about restricting domains.

Encourage students to realise that domains can be restricted to just specific numbers such as $x = \{2, 3, 5\}$. Contrast the resulting graph with a domain such as $x \in \mathbb{R}$.