

### Why use this resource?

Students are asked to arrange functions in a two-way table, or 'Function Square', according to whether they have certain properties. Students then create their own Function Squares.

Students can start to build familiarity with a basic library of functions and their properties using this resource. The resource does not use formal terminology such as domains, one-to-one or many-to-one, odd or even, but offers opportunities to discuss these ideas.

### Preparation

This is a card sort so cards need to be prepared. The functions are available as graphs and equations. They can be printed back-to-back to link the two representations, or separately to give you just one representation if you prefer. (Please ensure you have selected A4 size for double-sided printing.)

If desired, the two-way tables in the main problem are available as a single printable page.

### Possible approach

The warm-up could be done as a mini whiteboard exercise or whole class discussion before students work on the main exercise in pairs or small groups. Each student should keep a record of the conclusions they draw so that they are ready to justify their decisions.

Students could just be given the first half of the set of functions cards to start with and then asked to extend their ideas when the rest of the functions are introduced. Which extra properties do these functions share with functions in the first set?

Introducing the extra functions may encourage students to notice or reflect on any conjectures they have made based on the functions seen so far. For example, for the second table, they may think that if different values of  $x$  can give the same value of  $f(x)$ , the function must have a line of symmetry, but this is contradicted by  $f(x) = x^3 - x$ .

### Possible support

Students may be more confident in identifying certain properties from the equations or from the graphs. They can be encouraged to look at the other cards/side of the cards if they are struggling with one representation and they may need to swap between the two.

### Possible extension

Students are asked to think about a 'Function Cube' that combines three properties.