Compose!

Teacher notes

Why use this resource?

Students are given four functions and asked to compose them to create the given set of six new functions. In so doing they will exercise the tools of composition of functions whilst solving an interesting problem.

Preparation

By way of preparation the resource asks students to think about and define the biggest possible domain and range of each of the input functions. This is an important thing to keep in mind when composing functions and is revisited for each of the compositions.

A page giving definitions of the terms domain and range is provided as a printable extra. This may be useful where students are not completely fluent with the idea of a *chosen* domain as opposed to the largest possible domain.

The problem page can be presented as a printout for students to work on.

Possible approaches

Rather than composing pairs of the given functions at random, students should be encouraged to think about the properties of the target function they are trying to make and look for input functions with similar or related properties.

Students may need to be helped to understand that the largest possible domain of a composition is not necessarily the same as that of the target function $f(x)$.

The six exercises should be treated as a package as they progressively introduce further ideas and concepts. After the first couple, the idea arises that more than two functions might need to be composed. Later on the ideas of self-composition and self-inverse functions arise.

Key questions

- What would happen if you composed those two functions the other way round?
- What do these functions have in common? How are they different?
- Describe the features of the function you're trying to make. Do any of the source functions have similar features?
- What would you get if you composed one of the functions with itself?

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