How fast does it grow?

Teacher notes

Why use this resource?

This resource provides a framework for exploring the difference between an exponential and a power of x, thinking about values of expressions and also the graphs of their functions. Just how big is an exponential? Students can start with substitution of values and move on to generalise their results, aiming to understand whether or not an exponential function always wins out over a power of x as x becomes large.

Preparation

You may want to have graphing software ready to display.

Possible approaches

This resource could be used either as a quick introductory activity or as a more open-ended investigation.

As a quick introductory activity it could be followed by Reach for the stars.

Key questions

- When is $2^x = x^2$?
- Is the same one bigger if x is negative?
- What happens as a gets smaller?
- Is there a general rule for which is bigger?

Possible support

Graphing software could be helpful.

A version of this resource has been featured on the NRICH website. You might like to look at some students' solutions that have been submitted there.