The Rules of Indices with Algebraic Expressions

Once students are confident with evaluating indices numerically it is time to apply the rules of indices to algebraic expressions. As an introduction, arrange students into pairs and give each pair a set of the **'Indices Cards' below.**

Students should be asked to:

- Find as many pairs of equivalent expressions as possible.
- Find two cards that multiply together to make a third card.
- Find two cards that divide to give a third card.
- Make up expressions using multiplication and/or division that give the answer x (variations can be given as the answer)

This activity can be used to address popular misconceptions such as $\dfrac{1}{2x^2} = 2x^{-2}$ and that a negative index is equivalent to a negative number.

There is not a matching pair for every card. This leads to a follow up task in which students are asked to pair up as many of the cards as possible and then make an equivalent pairing for those cards without a pair.

x^{-3}	x^3	x^2	$\sqrt{x}$
$x^{\frac{3}{2}}$	$x^{\frac{1}{2}}$	$x^{\frac{2}{3}}$	$x\sqrt{x}$
$x^{-\frac{1}{2}}$	$-2x^{-2}$	$\dfrac{\sqrt{x}}{x}$	x^4
$\frac{1}{2}x^{-\frac{1}{2}}$	$\frac{1}{2}x^{-2}$	$x^{\frac{1}{3}}$	x
$\sqrt[3]{x}$	x^{-1}	$2x^{-1}$	$2\sqrt{x}$
$\frac{1}{3}x^{-\frac{1}{3}}$	$-x^{-2}$	$\dfrac{1}{2x^2}$	$\frac{1}{2}x^{\frac{2}{3}}$