Equation or identity? (I)

Teacher notes

Why use this resource?

This resource, like the later Equation or identity? (II) at Trigonometry: compound angles, gives practice in manipulating known identities (and chance to reinforce their learning) and thinking about the move to trigonometric functions whilst probing the difference between an equation and an identity. It provides some thought-provoking examples to explore. It could be used solely for practice in manipulating trigonometric equations and identities or used to explore or reinforce new knowledge about the graphs and their transformations.

The resource Equation or identity II at the Trigonometry: Compound Angles station could be used by those wanting to explore further but uses compound angle formulae.

Preparation

Students need to know the standard identities such as the trigonometric definitions and the Pythagorean identity (in all its versions – unless these will be explored through this resource).

Some knowledge of transformations will be needed for some approaches to solving these. Familiarity with the graphs might be developed through this resource, but it will probably be useful if the graphs have been seen.

Possible approach

This would make a nice activity for students working in pairs or small groups.

Students might start by making a list of identities and information they know and then plenary these as a class before working in their groups. Alternatively a plenary might come part way through after students have puzzled through what kinds of information they might need to use.

Key questions

- Which formula might you try here?
- What simple triangles do you know that you could try this on?
- What different types of triangles are there? Are you convinced it would work for them all?
- What is the difference between an equation and an identity?
- How can you prove…?
- Can you convince your peers that …?

Possible support

- How are *sine* and *cosine* of an angle related?
- How are the angles in a triangle related?
- Might it be easier to work right to left?
- Can you think of another way of writing that part?
- What does the graph of $\sin A$ look like? $\sin(\pi - A)$?

Possible extension

- Can you come up with some of your own?
- Are the identities true if A, B, and C are not the angles of a triangle?
- Could you find another way of proving any of these (e.g. using graphical transformations if you have used algebra or vice versa)?

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.