Trigsy integrals

Teacher notes

Why use this resource?

Students are asked to think about the different ways they can integrate trigonometric functions such as $\sin^2 x$ and $\arccos x$ using their knowledge of the functions and basic ideas from calculus. The resource provides opportunities to review the difference between a definite integral and an area between the curve and an axis, as well as to highlight how transformations can help when dealing with integrals involving trigonometric functions.

These questions could also be returned to when students have learned the techniques of integration by substitution and parts. Does their approach change? Which can now be done in different ways?

Preparation

These questions can be tackled before students have met trigonometric integration.

Possible approach

Since many of the methods discussed in the solution are based on the graphs of functions, it may be beneficial to allow students access to graphing software.

You may choose to use only one of the pairs of integrals given, and return to the other pair later.

Key questions

- What is the difference between a definite integral and the area between a curve and the x axis?
- The integrals given have carefully chosen limits. Would any of your methods work regardless of the limits?

Possible support

It will be helpful to encourage students to graph the functions in the integrals, for instance using graphing software.

Possible extension

Most of the techniques used for these integrals only work because of the carefully chosen limits. Students could be asked to invent their own examples of integrals that can be calculated using alternative methods.

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