Trig ratios in four quadrants

Teacher Notes

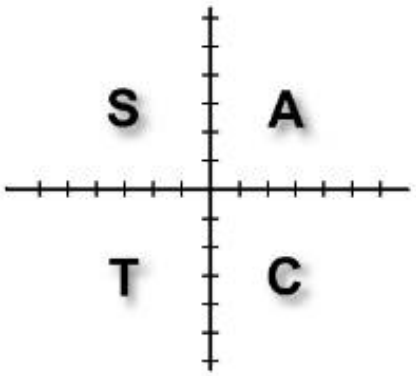
Introduction

The aim of this activity is to allow students to discover the various relationships between sine, cosine and tangents for angles between 0° and 360°, including that the sine of an angle is equal to the cosine of its complement.
For example,

sin 35º = cos 55º
sin 150º = sin 30º,
cos 135°= ⁻cos 45º,
tan 280° = ⁻tan 80°.

The activity makes use of the **CAST** diagram. This is a way of remembering whether the sine, cosine and tangent are positive for angles in the four quadrants.

For angles in the first quadrant,	**A**ll the trig functions are positive.
In the second quadrant, only the	**S**ine is positive.
In the third quadrant, only the	**T**angent is positive.
In the fourh quadrant, only the	**C**osine is positive.



Resources

There is a TI-Nspire document entitled FourQuadrants.tns for use with this activity.

Skills required

Pupils should…

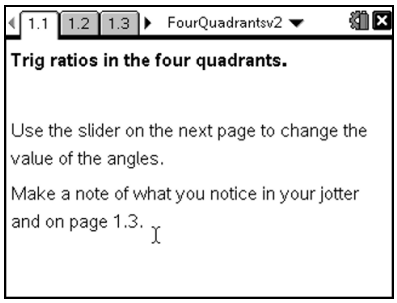
- Be able to move between pages of a tns file.
- Be able to grab and move points.
- Use the scratchpad to calculate.
- Be familiar with using a slider.

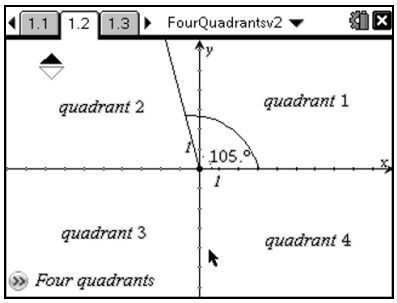
The activity

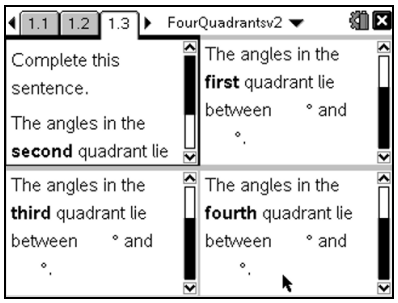
Students need to download and open the tns file, FourQuadrants.tns

Problem 1

The document starts with an introduction of the four quadrants.
Students are asked to use the slider to change the angle values and make comments.

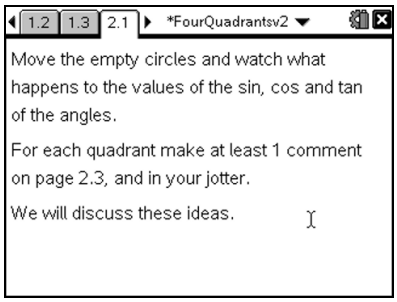


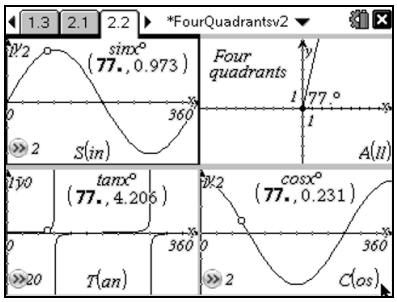


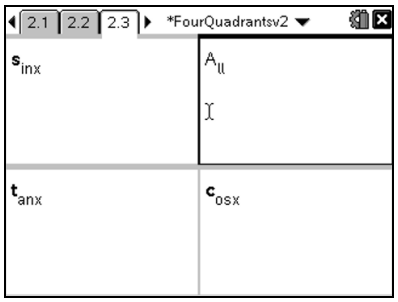


Problem 2

Students are able to change the displayed angle by grabbing and moving any the empty circles. They should note what happens to the values of the trig functions shown and are asked to make a comment for each quadrant, which can then be used as a basis for class discussions.







Problem 3

Students are given a set of twelve questions, in multiple-choice format, to consolidate their understanding of related angles.