

Summary 2**The Unit Circle, Coordinates, and Reference Angles**

The purpose of this activity is to move to angles greater than 90° in our investigation of sine and cosine. This will be accomplished by first introducing a quarter unit circle so that students will make a connection from their previously acquired ratio knowledge, to the idea of sine and cosine as the coordinates of the intersection of the terminal side of an angle in standard position and the unit circle. Once the coordinate notion of the two basic trig ratios has been accepted, students will be introduced to a full unit circle. The idea of negative distances on the coordinate plane will be introduced and students will test the coordinate definitions of sine and cosine by using the calculate feature of GSP. Students will then move on to examine the trig values for angles greater than 90° by using reference angles to work back to the ratio definition and verify that the coordinate interpretation is valid. Students will investigate the sign of the cosine and sine ratios through the use of reference angles in each of the four quadrants. Students will also make the discovery that the magnitudes of the sine and cosine of angles that have a common reference angle are equivalent. This activity is not designed to include the topic of reference angles in its entirety; the incorporation of reference angles is so that students are able to connect the trigonometric ratios to right triangles. For homework, students will discover the four other trigonometric ratios based on permutations of the opposite, adjacent, and hypotenuse terminology.