

The **Trig Tour** simulation allows students to flexibly translate between multiple representations of trig functions, discover patterns, estimate or determine exact values of trig functions, and deduce the sign (+, -, 0) of trig functions for any given angle without a calculator.

**OBSERVE** the coordinates change as theta changes

**DRAG** around the circle and watch values change.

**DRAG** along the graph and watch the circle change.

**COMPARE** different trig functions

**SHOW** exact values for special angles.

$(x,y) = \left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$   
 $\text{angle} = 225^\circ$   
 $\cos\theta = \frac{x}{1} = -\frac{\sqrt{2}}{2}$

## Insights into Student Use

- Unless prompted, students may not notice that they can drag both the red dot along the unit circle and the red dot along the graph.
- Students can continue to rotate the red dot around the circle many times even as the graph extends outside of view.

## Suggestions for Use

### Sample Challenge Prompts

- Using the formula for the circumference of a circle, find the circumference of a unit circle. What is the relationship between radians and circumference?
- Minimize the Values panel and estimate the coordinates of a point on the circle. Maximize the panel to check your answer. Turn on the Grid to help you!
- What does the graph of each trig function look like beyond the view in this sim? How do you know?
- Turn on Special Angles and play with the sim. Write down any patterns you observe in the Values panel, the graph, or around the circle.
- Keep  $\theta$  in the first quadrant and turn on Labels. Use your knowledge of right triangle trigonometry to explain why  $\cos\theta = x$ ,  $\sin\theta = y$ , and  $\tan\theta = \frac{y}{x}$ .

### Sample Pre- and Post-Assessment Questions

- Determine the sign (positive or negative) for  $\sin(330^\circ)$ ,  $\cos(205^\circ)$ , and  $\tan(112^\circ)$ .
- Determine the value of  $\theta$  for the following coordinate pairs:

$$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right), \left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right), \left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right), \left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

See all published activities for Trig Tour [here](#).

For more tips on using PhET sims with your students, see [Tips for Using PhET](#).