PhET Tips for Teachers

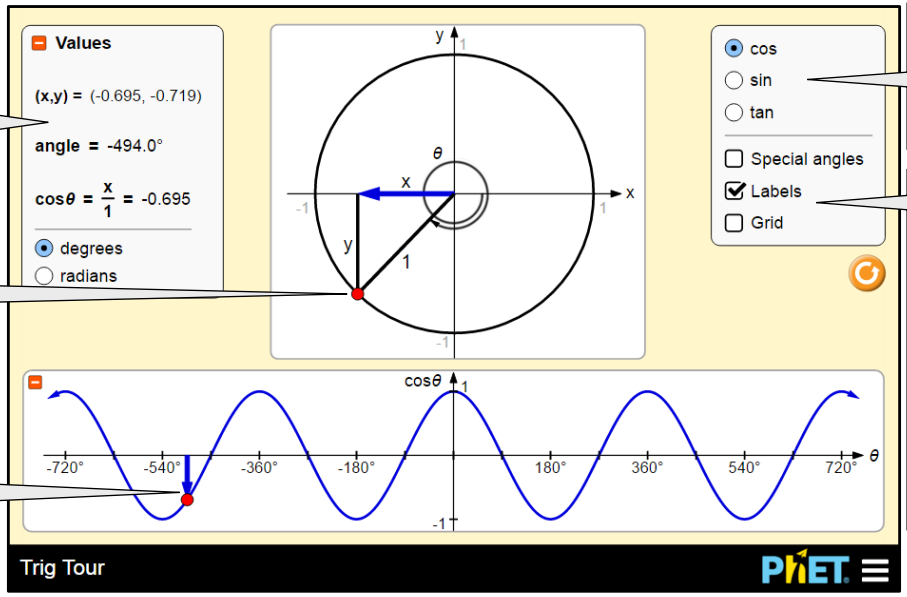
Trig Tour

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.

$(x,y) = \left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

angle = 225°

$\cos\theta = \frac{x}{1} = -\frac{\sqrt{2}}{2}$

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.

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- Keep θ 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 $\tan\theta = \frac{y}{x}$. Using two functions in your function machine, find an example of when the order in which you place them matters. Describe your findings. Find a different example of when the order does not matter. Summarize when the order does and does not matter.

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 θ 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.

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