

Measuring in the Round: A Concrete Introduction to Radians

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References

- Based on the article, “The Wrapping Function Kit” by Dan Kalman in *Mathematics Teacher*, September 1978, pp 516-17.
- Presented in Navigating through Mathematical Connections in Grades 9–12, by Burke, M.J., Hodgson, T., Kehle, P., Mara, P., & Resek, D., (2006), National Council of Teachers of Mathematics.

Prerequisite

Work with circular trig functions and degrees

What you need to do

- Find a partner
- Come get a strip of adding machine tape
- Get a compass
- Get a straight edge if you need one

Make a Ruler

- Choose a radius with your compass, (Under 2 inches)
- Use your radius as the unit and mark off units on your tape.
- Mark off half units on your tape.

Find π

- Draw a circle using your original radius.
- Find π on your ruler.

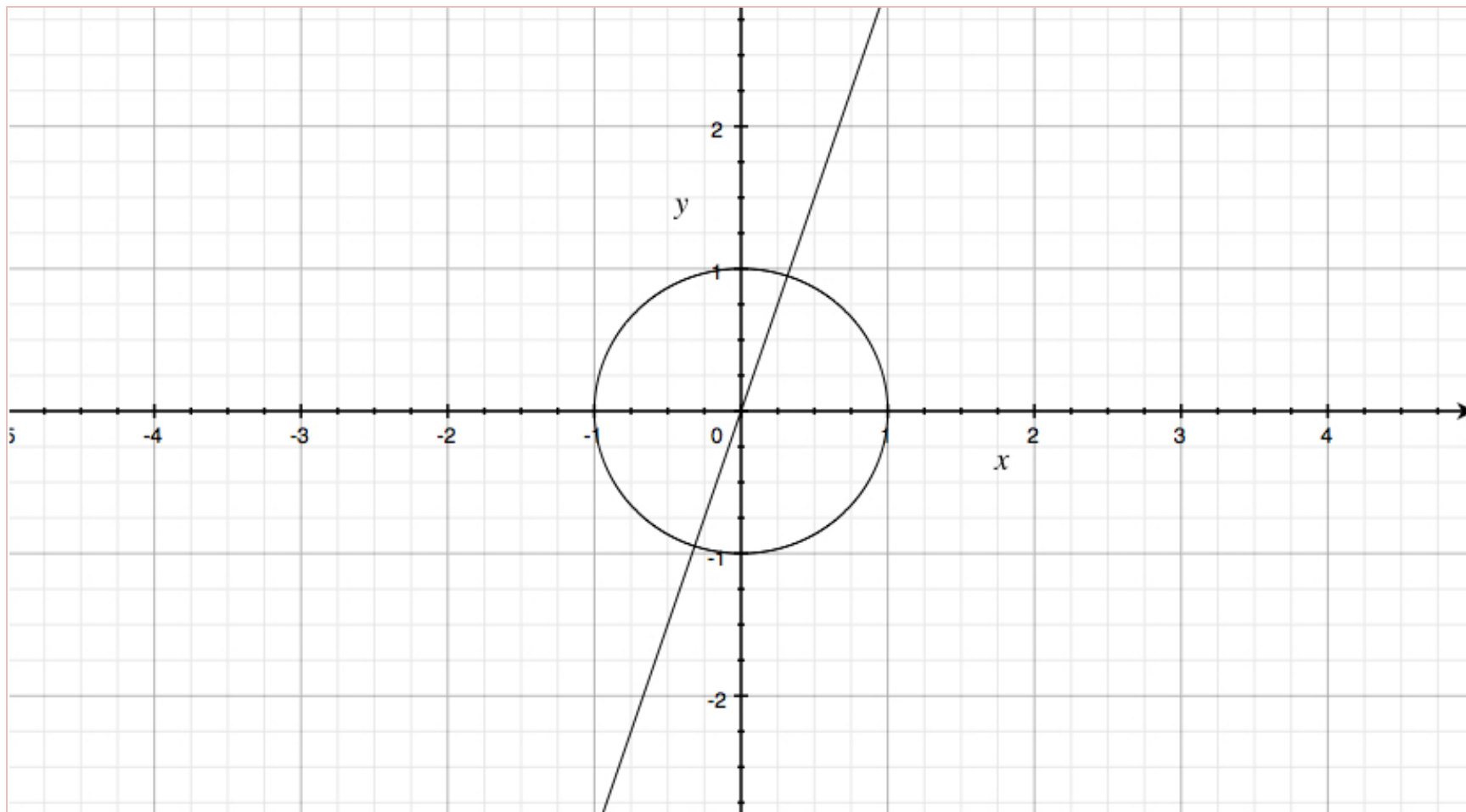
Measure an Angle

- Draw an angle on a sheet of paper.
- Figure out how to use your tape to measure that angle.

Find Radians around the Unit Circle

- Draw coordinate axes on a new sheet of paper.
- Draw a circle using your original radius and the origin as its center.
- Starting from the point $(1,0)$, mark 1 radian on the circle going in the counterclockwise direction.
- Mark 2 radians, 1.5 radians, 5 radians, 10 radians, -2 radians.

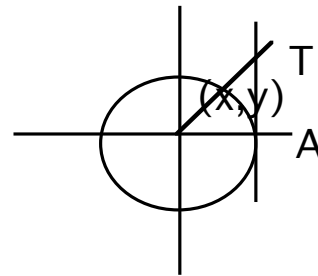
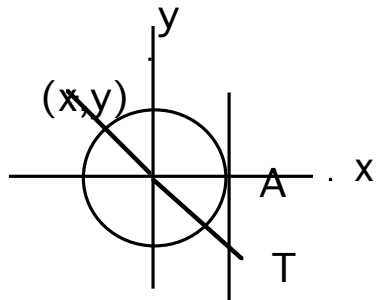
What's the Sine?



Graph the Sine Function

- On a new sheet of paper, draw coordinate axes.
- Use your tape to mark off radians on both axes – positive and negative.
- Use the unit circle you drew on coordinate axes to graph the sine function on your new axes.
- If time permits, graph the cosine function.

The Tangent



Graph the Tangent Function
on a new Coordinate Axes

Questions???

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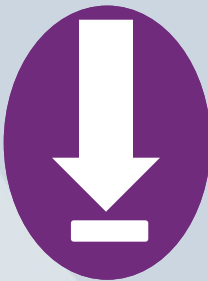


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