## Unit 6 Lesson 9: Introduction to Trigonometric Functions

### 1 An Angle and a Circle (Warm up)

#### Student Task Statement

Suppose there is a point $P$ on the unit circle at $\left(1,0\right)$.



1. Describe how the $x$-coordinate of $P$ changes as it rotates once counterclockwise around the circle.
2. Describe how the $y$-coordinate of $P$ changes as it rotates once counterclockwise around the circle.

### 2 Do the Wave

#### Student Task Statement

1. For each tick mark on the horizontal axis, plot the value of $y=cos\left(θ\right)$, where $θ$ is the measure of an angle in radians. Use the class display of the unit circle, the unit circle from an earlier lesson, or technology to estimate the value of $cos\left(θ\right)$.
* 
1. For each tick mark on the horizontal axis, plot the value of $y=sin\left(θ\right)$. Use the class display of the unit circle, the unit circle from an earlier lesson, or technology to estimate the value of $sin\left(θ\right)$.
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1. What do you notice about the two graphs?
2. Explain why any angle measure between 0 and $2π$ gives a point on each graph.
3. Could these graphs represent functions? Explain your reasoning.

### 3 Graphs of Cosine and Sine

#### Student Task Statement

1. Looking at the graphs of $y=cos\left(θ\right)$ and $y=sin\left(θ\right)$, at what values of $θ$ do $cos\left(θ\right)=sin\left(θ\right)$? Where on the unit circle do these points correspond to?
2. For each of these equations, first predict what the graph looks like, and then check your prediction using technology.
	1. $y=cos\left(θ\right)+sin\left(θ\right)$
	2. $y=cos^{2}\left(θ\right)$
	3. $y=sin^{2}\left(θ\right)$
	4. $y=cos^{2}\left(θ\right)+sin^{2}\left(θ\right)$

#### Images for Activity Synthesis





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