

The Circle of Terror - Graphing Cosine

Steve is back at *Great Galaxy Amusements*, except this time he's brought his friend Cody. He noticed the park has installed a new component to the Screamer ride: a long golden pole extending vertically through the center of the ride. The sign says, "NEW!! Reach the golden post and win a fabulous prize!". Cody is anxious to win the prize so he boards the ride. As usual, the kilometer markers indicate how far he has traveled along the track. But now, Cody needs to pay attention to the relationship between the distance he's traveled along the track and his **horizontal distance to the right or left** of the golden post.

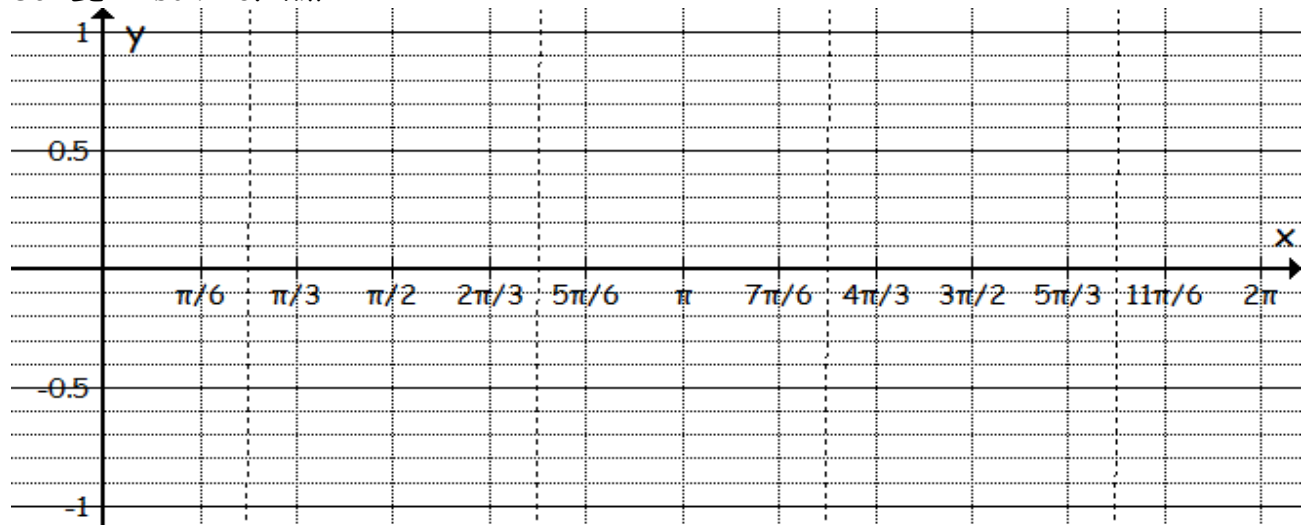
1) Using your unit circle, complete the table below. Use negative numbers to indicate distance to the left of the post.

Distance Travelled Around Circle (km)	Horizontal distance from the center (km)	Horizontal distance as a decimal
0		1
$\frac{\pi}{6}$		
$\frac{\pi}{4}$		
$\frac{\pi}{3}$		
	0	
$\frac{2\pi}{3}$		
$\frac{3\pi}{4}$		
$\frac{5\pi}{6}$		

Distance Travelled Around Circle (km)	Horizontal distance from the center (km)	Horizontal distance as a decimal
π	-1	
$\frac{7\pi}{6}$		
$\frac{5\pi}{4}$		
$\frac{4\pi}{3}$		
	0	
$\frac{5\pi}{3}$		
$\frac{7\pi}{4}$		
$\frac{11\pi}{6}$		
2π		

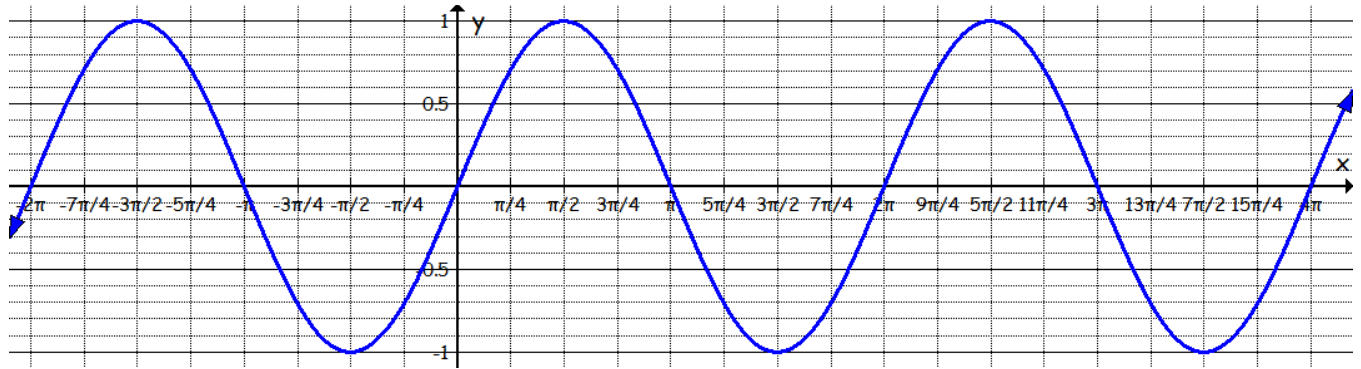
2) Graph your table of values below by plotting the points. The location of the $\frac{\pi}{4}$ family on the graph below is marked but not labeled.

SCALE: 1 box = 0.1 km



3) Why is Cody's graph the graph of $y = \cos(x)$?

4) What would happen if Cody did a second loop or went backwards?
Precisely add the cosine graph to the sine graph below.



Investigate both functions by completing the tables.

$$y = \sin(x)$$

x-intercept(s)	
y-intercept	
Domain	
Range	
asymptotes	

$$y = \cos(x)$$

x-intercept(s)	
y-intercept	
Domain	
Range	
asymptotes	

Explain how the graph of $y = \cos(x)$ and $y = \sin(x)$ are similar.

Explain how the graphs are different.