Unit 1 Group Work
PCHA 2022-23 / Dr. Kessner

No calculator, no notes – just your brain! Have fun!

1. Evaluate the following:

a) $\cot \frac{\pi}{2}$

b) $\tan \frac{5\pi}{4}$

c) $\sec \frac{5\pi}{3}$

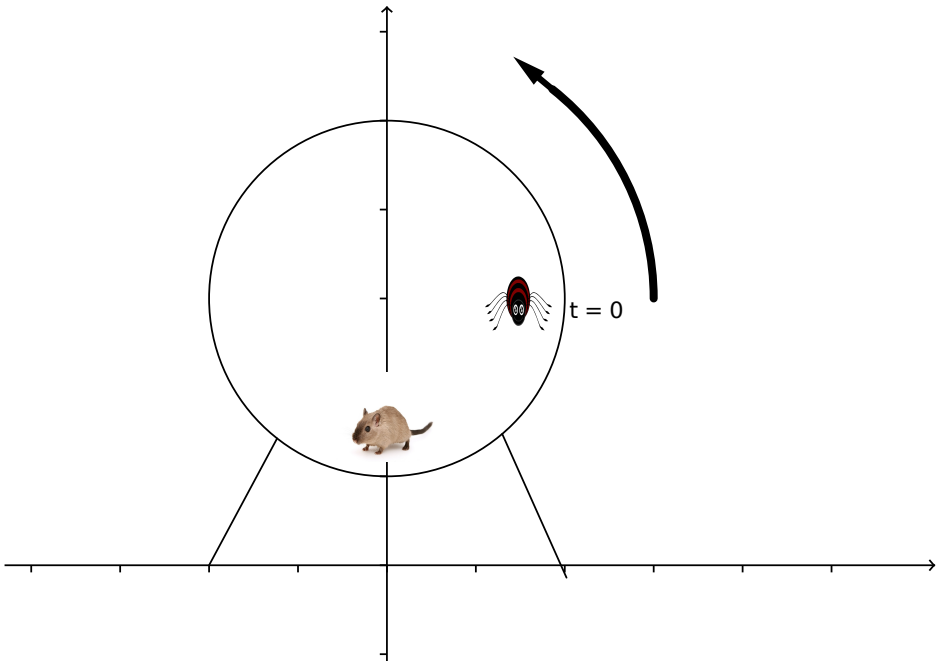
d) $\cos \frac{25\pi}{2}$

e) $\tan^{-1}(\sin \frac{25\pi}{2})$

f) $\sin^{-1}\left(\tan(\cos^{-1}(-1))\right)$

2. A spider jumps onto a hamster wheel at the right-most (3 o'clock) position. This scares the hamster, which tries to run away from the spider quickly, rotating the hamster wheel at a rate of 1 revolution every 6 seconds. The hamster wheel has a radius of 8 inches and the bottom of the wheel is 2 inches above the ground.

a) Graph the x and y position of the spider, $x(t)$ and $y(t)$. Find equations for both $x(t)$ and $y(t)$.



b) Calculate the position $(x(t), y(t))$ of the spider at $t = 3$ and $t = 6$. Make sure your answers make sense. When does the spider reach the hamster (assuming the hamster stays at the bottom of the wheel)?

3. Write down all the relevant properties (period, amplitude, shifts/scales, asymptotes) of the following trig functions, and then graph by hand. Write the domain and range of the function.

a. $f(x) = 2\sec(x - \frac{\pi}{2}) - 1$

b. $g(x) = \frac{1}{2}\cot(\frac{x}{3}) + 1$