SI Worksheet 10: Inverses

1. Find the exact values of the following composite functions
	1. $cot⁡(sin^{-1}\left(-\frac{2}{3}\right))$
	2. $cos⁡(tan^{-1}\left(-9\right))$
	3. $tan⁡(cos^{-1}\left(-\frac{2}{5}\right))$
2. Rewrite the following composite inverse functions as an expression involving a variable
	1. $tan⁡(cos^{-1}\frac{v}{4})$
	2. $cos⁡(sin^{-1}\frac{u}{\sqrt{9+u^{2}}})$
	3. $sin⁡(tan^{-1}\frac{v}{\sqrt{4-v^{2}}})$
3. Solve the following real-world problems
	1. In Laramie, the daily hours of sunlight is modeled by the equation $L\left(t\right)=12+3.1sin⁡(\frac{2π}{365}t)$. $L\left(t\right)$ is the number of sunlight hours in a day and t is the number of days after March 20th. During the first year, when will there be 14 hours of sunlight?
	2. Suppose a projectile is fired from a cannon with an initial velocity and an angle of elevation θ. The distance it travels in feet is given by $R\left(θ\right)=\frac{v\_{0}^{2}sin2θ}{32}$. If $v\_{0}=80 ft/s$, what angle should you use to hit the ground 102 feet in front of the cannon?
	3. The population sizes of the squirrels on campus can be modeled by the equation $p\left(t\right)=4067-1187cos⁡(\frac{2π}{7}t)$. $p\left(t\right)$ is the total population, and t is the time in years. During the first 7 years, when will the population size be 4700?