SI Week 13 (Exam 3 Review)

1. Solve the following real-world situations.
	1. The population sizes of many animal species rises and falls over time. Suppose the population of big horn sheep in Wyoming is modeled as $P\left(t\right)=4254-1223cos⁡(\frac{2π}{5}t)$. $P\left(t\right)$ represents the total population size and *t* is the time in years. During the first 5 years, when will the population be 4800?
	2. The brightness of some stars can fluctuate over time (called Cephid Variable stars). The brightness of one of these is defined by $B\left(t\right)=7.7+10.7sin⁡(\frac{2π}{63}t)$. $B\left(t\right)$ represents the magnitude of brightness, and *t* is the time in days. During it’s first 63 days, when will the stars magnitude of brightness be 14?
	3. Suppose a projectile is fired from a cannon with some initial velocity and an angle of elevation θ. The horizontal distance *R(θ)* is given by $R\left(θ\right)=\frac{(v\_{0})^{2}sin2θ}{32}$. If you initially fire the cannon at 160 ft/s, and you want to hit a target 435 feet in front of you, what angle should you use?
2. Consider the following triangles and solve for the missing pieces.

Suppose b=60, c=71, and B=33°.

1. Solve the following word problems
	1. An airplane leaves city A and flies 149 km North to City B. It then turns through an angle of 49° and flies 119 km to City C. What angle θ with respect due north could the pilot have used to fly directly from City A to City C?
	2. You’re flying 2 kites. The first kite has a 97-foot string, and the second has a 116 foot string. The angle made by the 2 strings is 29°. Find the distance between the 2 kites.
	3. Two airplanes leave an airport at the same time. An hour later, the planes are 192 km. If one plane has traveled 167 km and the other has traveled 189 km during that hour, find the angle between their flights.