# Module 12 Assessment - Real World Applications

1. The populations of many animal species fluctuate in regular cycles. Frequently, this is the result of a predator-prey relationship, such as that of rabbits and wolves, and biologists use sine and cosine functions to model this behavior. In one region, the population of rabbits, *R*, and the population of wolves, *W*, fluctuate over a ten year cycle and may be modeled as follows:



where *t* is the time in years,.

1. Create a table of values for .
2. Use the graphing calculator to determine at which values of *t* does the rabbit population fall below 6000?
3. Use the graphing calculator to determine at which values of *t* is the wolf population at a minimum?

1. The depth, *d*, of a certain tidal bay is modeled by the function:



where *t* is the number of hours after 12:00 A.M. on any given day.

1. At what times is the tide at its highest level?
2. At what times is the tide at it lowest level?
3. During what times of the day is the tide above 35 feet?