Assignment 8A3: Sinusoid Applications

Answer the following problems from your Lippman/Rasmussen textbook with as much detail, explanation, and work that is appropriate.

1. Outside temperature over the course of a day can be modeled as a sinusoidal function. Suppose you know the temperature is 50 degrees at midnight and the high and low temperature during the day are 57 and 43 degrees, respectively. Assuming t is the number of hours since midnight, find a function for the temperature, D, in terms of t.

2. A Ferris wheel is 25 meters in diameter and boarded from a platform that is 1 meters above the ground. The six o'clock position on the Ferris wheel is level with the loading platform. The wheel completes 1 full revolution in 10 minutes. The function $h(t)$ gives your height in meters above the ground t minutes after the wheel begins to turn.
   a. Find the amplitude, midline, and period of $h(t)$.

   b. Find a formula for the height function $h(t)$.

   c. How high are you off the ground after 5 minutes?

3. A spring is mounted on a stand with a weight attached to it. At its maximum height (M), the spring is 34 cm from the ground. At its minimum height (m), the spring is 12 cm from the ground. When the spring is released, it takes .4 second for one complete cycle of the spring. Write a function $h(t)$ to model the height of the weight in cm at time t in seconds.