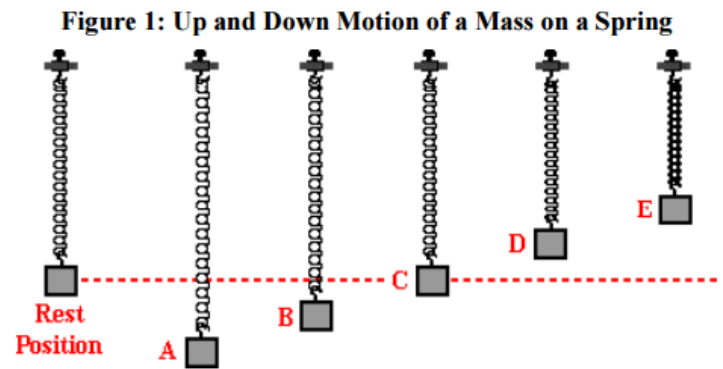


Applications of Periodic Functions

- 1) A mass is suspended from a spring as shown in the illustration. The spring is stretched a distance of 4 cm and then released at point A. It is observed that the mass returns to the stretched position after $\frac{1}{3}$ second. Assume there is no friction. Write a periodic function that describes the motion of the mass. Where is the mass at 5 seconds?



- 2) A variable star is one whose brightness alternately increases and decreases. For the most visible variable star, Delta Cephei, the time between periods of maximum brightness is 5.4 days. The average brightness (or magnitude) of the star is 4.0, and its brightness varies by ± 0.35 magnitude. Express the brightness as a function of time. Visit <http://astronomynow.com/2015/05/13/delta-cepheis-secret-companion-and-intriguing-past/>

- 3) The London Eye is the huge ferris wheel located on the Thames River in London. It has a diameter of 394 feet, and its center is located 221 feet above the ground. It makes one revolution (its period) every 30 minutes. (Source: Wikipedia). Write a trigonometric function to model a ride on the London Eye.



- 5) Mr. Smith has a Rolex watch with a sweep second hand on it (he wishes). The hand obviously makes one complete revolution every minute. The length of the second hand is 11mm. Write a trigonometric function that models the vertical position of the second hand over time. Let the 12 represent the starting position at 0 seconds.

