

Accelerated Math 3
Applying Periodic (Trig) Functions

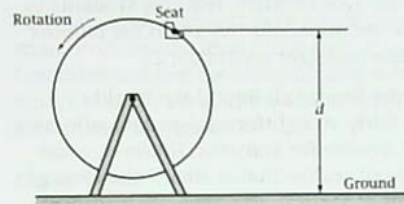
1. Draw a sinusoid with amplitude of 10 and the sinusoidal axis at -3 . One cycle of this sinusoid begins at $x = 4$. The next cycle starts at $x = 34$. The value of the function at $x = 34$ is -13 . What is the equation of this sinusoid? For what values of x does the graph equal 10?
- 2.

Supplementary Problems

1. *Ferris Wheel Problem:* As you ride a Ferris wheel, your distance from the ground varies sinusoidally with time. When the last seat is filled and the Ferris wheel starts, your seat is in the

position shown in Figure 3-7a. Let t be the number of seconds after the Ferris wheel starts. When $t = 3$ s, you first reach the top, 43 ft above the ground. The wheel makes a revolution every 24 s. The diameter of the wheel is 40 ft.

Figure 3-7a

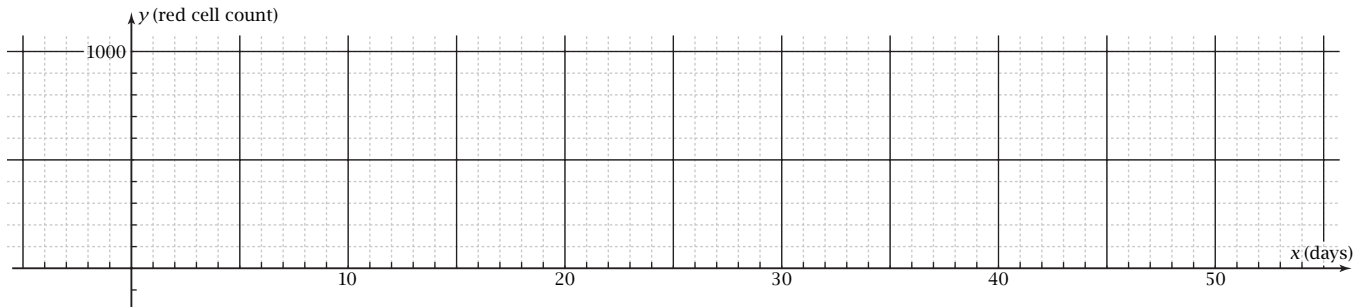


- a. Sketch the graph of the sinusoid.
- b. What is the lowest you go as the Ferris wheel turns? Why is it reasonable for this number to be greater than zero?
- c. Write a particular equation for distance as a function of time.
- d. Predict your height above the ground when $t = 20$.
- e. Find the first three times you are 18 ft above the ground.

Exploration 3-7a: Chemotherapy Problem

Objective: Use sinusoids to predict events in the real world.

Chemotherapy Problem: A woman has cancer and must have a chemotherapy treatment once every three weeks. One side effect is that her red blood cell count goes down and then comes back up between treatments. On January 13 (day 13 of the year), she gets a treatment. At that time, her red blood cell count is at a high of 800. Halfway between treatments, the count drops to a low of 200. Assume that the red blood cell count varies sinusoidally with the day of the year, x .



1. Draw the graph of the sinusoid on the given axes. Show enough cycles to fill the graph paper.
2. Write a particular equation for the (circular) sinusoid in Problem 1. It is recommended that you use the cosine function.

3. Enter your equation in your grapher. Plot the graph using the window shown. Explain how the graph verifies that your equation is correct.
4. The woman feels “good” if the red blood cell count is 700 or more, “bad” if the count is 300 or less, and “so-so” if the count is between 300 and 700. How will she be feeling on her birthday, March 19? Explain how you arrived at your answer.
5. Show on your graph the interval of dates between which the woman will feel “good” as she comes back from the low point after the January 13 treatment.
6. Find precisely the values of x at the beginning and end of the interval in Problem 5 by setting $y = 700$ and using appropriate numeric or graphical methods. Describe what you did.
 $x =$ _____ and $x =$ _____
7. What did you learn as a result of doing this Exploration that you did not know before?