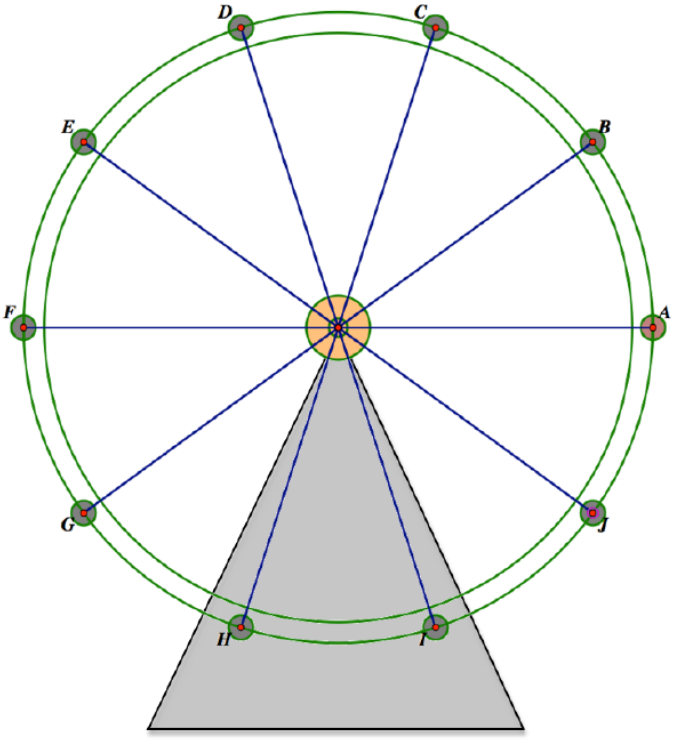
1.12 Getting on the Right Wavelength

More Trig Modeling

The Ferris wheel in the following diagram has a radius of 40 feet, its center is 50 feet from the ground, and it makes one revolution counterclockwise every 18 seconds.



1. Write the equation of the height of the rider at any time t, if at $t = 0$ the rider is at position A (Use radians to measure the angles of rotation).

2. At what time(s) is the rider 70 feet above the ground? Show the details of how you answered this question.

3. If you used a sine function in question 1, revise your equation to model the same motion with a cosine function. If you used a cosine function, revise your equation to model the motion with a sine function.

4. Write the equation of the height of the rider at any time t, if at $t = 0$ the rider is at position D (Use radians to measure the angles of rotation).

5. For the equation you wrote in question 4, at what time(s) is the rider 80 feet above the ground? Show or explain the details of how you answered this question.

6. If you used a sine function in question 4, revise your equation to model the same motion with a cosine function. If you used a cosine function, revise your equation to model the motion with a sine function.

7. Choose any other starting position and write the equation of the height of the rider at any time t, if at $t = 0$ the rider is at the position you chose. (Use radians to measure the angles of rotation). Also change other features of the Ferris wheel, such as the height of the center, the radius, the direction of rotation and/or the length of time for a single rotation. (Record your equation and description of your Ferris wheel here.)

8. Trade the equation you wrote in question 7 with a partner and see if he or she can determine the essential features of your Ferris wheel: height of center, radius, period of revolution, direction of revolution, starting position of the rider. Resolve any issues where you and your partner have differences in your descriptions of the Ferris wheel modeled by your equation.