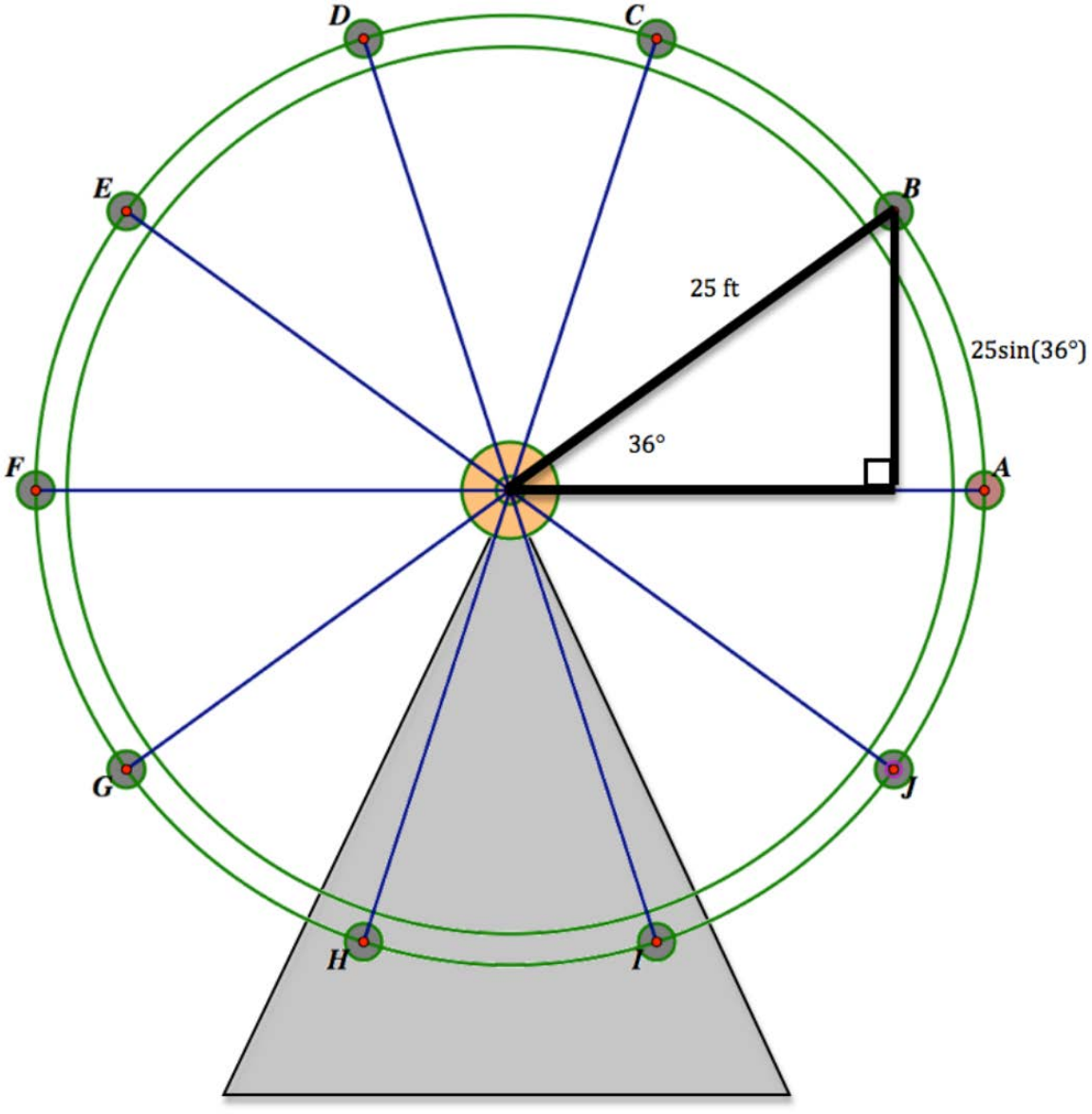
1.2 Do You Know "Sine" Language?

Trig Basics

In the previous task, *George W. Ferris' Day Off*, you probably found Carlos' height at different positions on the Ferris wheel using right triangles, as illustrated in the following diagram.



Recall the following facts from the previous task:

- The Ferris wheel has a radius of 25 feet
- The center of the Ferris wheel is 30 feet above the ground

Carlos has also been carefully timing the rotation of the wheel and has observed the following additional fact.

- The Ferris wheel makes one complete rotation counterclockwise every 20 seconds

1. How high will Carlos be 2 seconds after passing position A on the diagram?

2. Calculate the height of a rider at each of the following times t, where t represents the number of seconds since the rider passed position A on the diagram. Keep track of any regularities you notice in the ways you calculate the height. As you calculate each height, plot the position on the diagram.

Elapsed time since passing position A	Calculations	Height of the rider
1 sec		
1.5 sec		
2 sec		
2.5 sec		
3 sec		
5 sec		
6 sec		
8 sec		
9 sec		
10 sec		
12 sec		
14 sec		
15 sec		
18 sec		
19 sec		
20 sec		
23 sec		
28 sec		
35 sec		
36 sec		
37 sec		

40 sec		

3. Examine your calculations for finding the height of the rider during the first 5 seconds after passing position *A* (the first few values in the above table). During this time, the angle of rotation of the rider is somewhere between 0° and 90°. Write a general formula for finding the height of the rider during this time interval.

4. How might you find the height of the rider in other "quadrants" of the Ferris wheel, when the angle of rotation is greater than 90°?