1.1 George W. Ferris' Day Off

Practice

I. Topic: Revolutions and Angular and Linear Speed.

The number of degrees an object passes through during a given amount of time is called *angular speed.* For instance, the second hand on a clock has an angular speed of $\frac{360°}{min}$ while the minute hand on a clock has an angular speed of $\frac{360°}{hr}$.

(Remember that a revolution is a full circle or 360°.)

1. What is the angular speed of the second hand on a clock in degrees per second?

2. What is the angular speed of the minute hand on a clock in degrees per second?

3. What is the angular speed of the hour hand in degrees per hour?

Your grandparents probably enjoyed music just as much as you do, but they didn't have iPods or MP3 players. They had vinyl records and phonographs. Vinyl records came in 3 speeds. A record could be a 45, 33 $\frac{1}{3}$,or a 78. These numbers referred to the rpms or *revolutions per minute*.

4. Calculate the *angular speed* of the different record formats in degrees per minute.

a) 78 rpm record

b) 45 rpm record

c) $33\frac{1}{3}$ rpm record

Angular speed describes how fast something is turning. *Linear speed* describes how far it travels while it is turning. *Linear speed* depends on the circumference of a circle and the number of revolutions per minute.

Vinyl records were not the same size. A 45 rpm record had a diameter of 7 inches, a $33\frac{1}{3}$ rpm record had a diameter of 12 in., and a 78 rpm record had a diameter of 10 inches.

5. If a fly were sitting on the outer edge of a 45 *rpm* record, how far would it travel in one minute?

a) How far for a $33\frac{1}{3}$ record?

a) How far for a 78 *rpm* record?

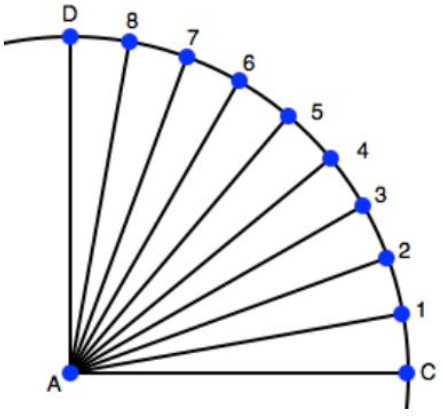
II. Using Trig Ratios to Solve Problems

Perhaps you have seen *The London Eye* in the background of a recent James Bond movie or on a television show. When it opened in March of 2000, it was the tallest Ferris wheel in the world. The passenger capsule at the very top is 135 meters above the ground. The diameter is 120 meters.

6. How high is the center of the Ferris wheel?

7. How far from the ground is the very bottom passenger capsule?

8. Assume there are 36 passenger capsules, evenly spaced around the circumference. Find the height from the ground of each of the numbered passenger capsules. Use the figure at the right to help you think about the problem.



III. Trigonometric Ratios

Find the other two trig ratios based on the one that is given.

9. $\sin\theta = \frac{4}{5}$	$\cos\theta =$	$\tan\theta =$
10. $\sin\theta =$	$\cos\theta = \frac{5}{13}$	$\tan\theta =$
11. $\sin\theta =$	$\cos\theta =$	$\tan\theta = 1$
12. $\sin\theta = \frac{1}{2}$	$\cos\theta =$	$\tan\theta =$
13. $\sin\theta =$	$\cos\theta = \frac{9}{41}$	$\tan\theta =$
14. $\sin\theta =$	$\cos\theta =$	$\tan\theta = \sqrt{3}$

IV. Assessment – Khan Academy

1. Complete the following online practice exercises in the Trigonometry unit of Khan Academy's Geometry course:
   a. https://www.khanacademy.org/math/geometry/hs-geo-trig/hs-geo-solve-for-a-side/e/trigonometry_2
   b. https://www.khanacademy.org/math/geometry/hs-geo-trig/hs-geo-solve-for-an-angle/e/solve-for-an-angle-in-a-right-triangle