

George W. Ferris' Day Off

A Develop Understanding Task

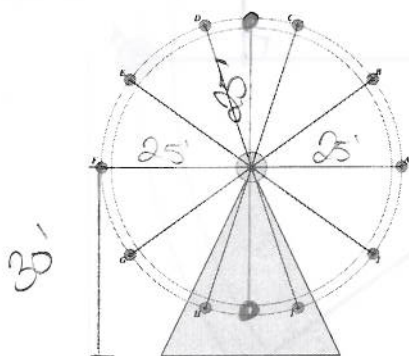
Sample Answers

Perhaps you have enjoyed riding on a Ferris wheel at an amusement park. The Ferris wheel was invented by George Washington Ferris for the 1893 Chicago World's Fair.

Carlos, Clarita and their friends are celebrating the end of the school year at a local amusement park. Carlos has always been afraid of heights, and now his friends have talked him into taking a ride on the amusement park Ferris wheel. As Carlos waits nervously in line he has been able to gather some information about the wheel. By asking the ride operator, he found out that this wheel has a radius of 25 feet, and its center is 30 feet above the ground. With this information, Carlos is trying to figure out how high he will be at different positions on the wheel.



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1. How high will Carlos be when he is at the top of the wheel?
(To make things easier, think of his location as simply a point on the circumference of the wheel's circular path.)

$$25' + 30' = 55'$$

2. How high will he be when he is at the bottom of the wheel?

$$30' - 25' = 5'$$

3. How high will he be when he is at the positions farthest to the left or the right on the wheel?

$$30'$$

Because the wheel has ten spokes, Carlos wonders if he can determine the height of the positions at the ends of each of the spokes as shown in the diagram. Carlos has just finished studying right triangle trigonometry, and wonders if that knowledge can help him.

4. Find the height of each of the points labeled A-J on the Ferris wheel diagram on the following page. Represent your work on the diagram so it is apparent to others how you have calculated the height at each point.

$$\theta = \frac{360^\circ}{10} = 36^\circ$$

$$\sin 2\theta = \frac{c}{25'}$$

$$c = 25' \cdot \sin 72^\circ \approx 23.776'$$

$$53.776' + 30' = 53.776'$$

$$\frac{14.695' + 30'}{44.695'}$$

$$\sin \theta = \frac{b}{25'}$$

$$b = 25' \cdot \sin 36^\circ \approx 14.695'$$

