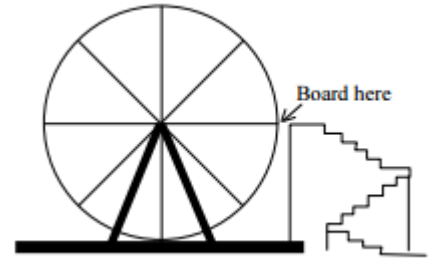


As Daring Dave Davis stands in line waiting to ride the huge Ferris wheel, he notices that this Ferris wheel is not like any of the others he has ridden. First, this Ferris wheel does not board the passengers at the lowest point of the ride; rather, they board after climbing several flights of stairs, at the level of that wheel's horizontal axis. Also, if Davis thinks of the boarding point as a height of zero above that axis, then the maximum height above the boarding point that a person rides is 30 feet, and the minimum height below the boarding point is -30 feet. Suppose the Ferris wheel is located on an x-y axis, with the center of the wheel located at the origin. Use this information to answer the questions below.



1. What are the coordinates of Dave's starting location? (_____ , _____)
2. What are the coordinates at the bottom of the wheel? (_____ , _____)
3. Write a general rule for the x- and y-coordinates of Dave's seat location as he moves around the Ferris wheel.
(_____ , _____)
4. What would the x and y coordinates for Dave's seat be if he had rotated counterclockwise 135 degrees from the start. Leave in exact form.
5. What would the x and y coordinate for Dave's seat be if he had rotated counterclockwise from the start $\frac{7\pi}{6}$ radians. Leave in exact form.
6. If Dave rotated $\frac{31\pi}{6}$ radians counterclockwise from the start how many degrees did he rotate?
Hint: $\frac{\text{central angle in radians}}{2\pi} = \frac{\text{central angle in degrees}}{360}$
7. What would the x and y coordinate for Dave's seat be if he had rotated counterclockwise from the start $\frac{14\pi}{3}$ radians. Leave in exact form.
8. This wheel can rotate both clockwise and counterclockwise. What would the x and y coordinate be if Dave rotated clockwise from the start $\frac{5\pi}{3}$ radians? Leave in exact form.
9. If the base of the ferris wheel is 5 feet above the ground, how far above the ground would Dave's seat be after he rotated $\frac{7\pi}{6}$ radians counterclockwise from the start?

Savannah is going to ride a similar Ferris wheel as Daring Dave. This Ferris Wheel instead has a maximum height above the boarding point of 18 feet, and a minimum height below the wheel of -18 feet. Use this information to answer the questions below.

10. Savannah boarded the Ferris Wheel and rotated an arc length of 54 feet. How many radians did Savannah rotate?

11. Savannah boarded the Ferris Wheel and rotated an arc length of 27 feet. How many radians did Savannah rotate? How many degrees did she rotate (round to the nearest hundredth)?

12. Savannah's cart stopped halfway around the circle from the starting point. She then rotated 65 degrees counterclockwise. At what radian measure did Savannah end up? What would the coordinates be at that location (round to the nearest hundredth)? Hint: You will need to use your calculator for this one.

13. Savannah was located at 315 degrees. She rotated 200 degrees counterclockwise. How many feet would she be away from the vertical axis. (Round your answer to the nearest hundredth)

14. **CP:** From the starting platform Savannah rotated counterclockwise 7π radians. At what coordinate would she be located. From that coordinate what would her distance around the arc be back to the starting platform?

15. **HN:** Savannah's cart was at the coordinate $(-9\sqrt{2}, 9\sqrt{2})$. How many radians would she have rotated counterclockwise to end up at the coordinate $(9\sqrt{3}, 9)$?