Arroyo P.6 5/16/22

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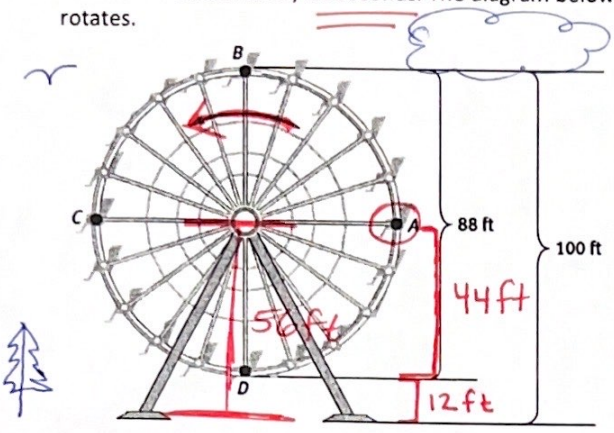
Notes: 35.1 Modeling Periodic Phenomena

The Sky Wheel (Ferris Wheel) Problem

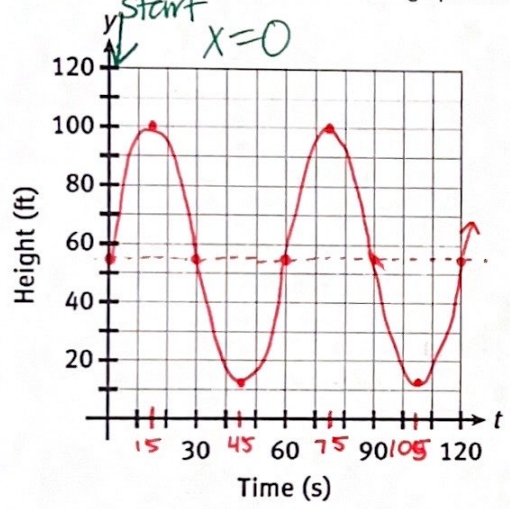
A Sky Wheel (Ferris Wheel) has a diameter of 88 feet. The highest point of the wheel is 100 feet above the ground. The wheel must make one rotation every 60 seconds. The diagram below represents all this information and displays the direction that the wheel rotates.



1. Complete the table below for the height of the rider that starts in position A.

Time (seconds)	0	15	30	45	60	75	90	105	120
Height (feet)	56	100	56	12	56	100	56	12	56

2. Plot the points from the table on the graph below.



3. What is the amplitude? How does this relate to the Sky Wheel?

A = 44; the radius of the wheel

4. What is the midline? How does this relate to the Sky Wheel?

y = 56; the height from the ground to the center of the wheel

5. What is the period? Use the equation $T = \frac{2\pi}{B}$ to figure out B.

T = 60; $60 = \frac{2\pi}{B}$

$60B = 2\pi$

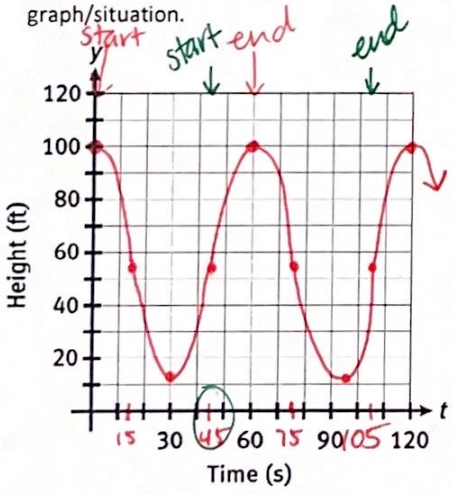
$B = 2\pi/60 \rightarrow \pi/30 = B$

6. Write an equation in the form $y = A\sin(B(x - C)) + D$ representing the height of the rider that starts at point A. (phase shift "start" left/right)

$y = 44\sin\left(\frac{\pi}{30}(x - 0)\right) + 56$

$y = 44\sin\left(\frac{\pi}{30}x\right) + 56$

7. Sketch a graph below representing the height of a rider that starts at position B. Then, write the equation for the graph/situation.



time	0	15	30	45	60	75	90	105	120
height	100	56	12	56	100	56	12	56	100

method 1

$y = 44\cos\left(\frac{\pi}{30}x\right) + 56$

method 2

$y = 44\sin\left(\frac{\pi}{30}(x - 45)\right) + 56$

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