Hon Pre Calculus
Quiz 4.5
Sinusoidal Modeling

Name [redacted]

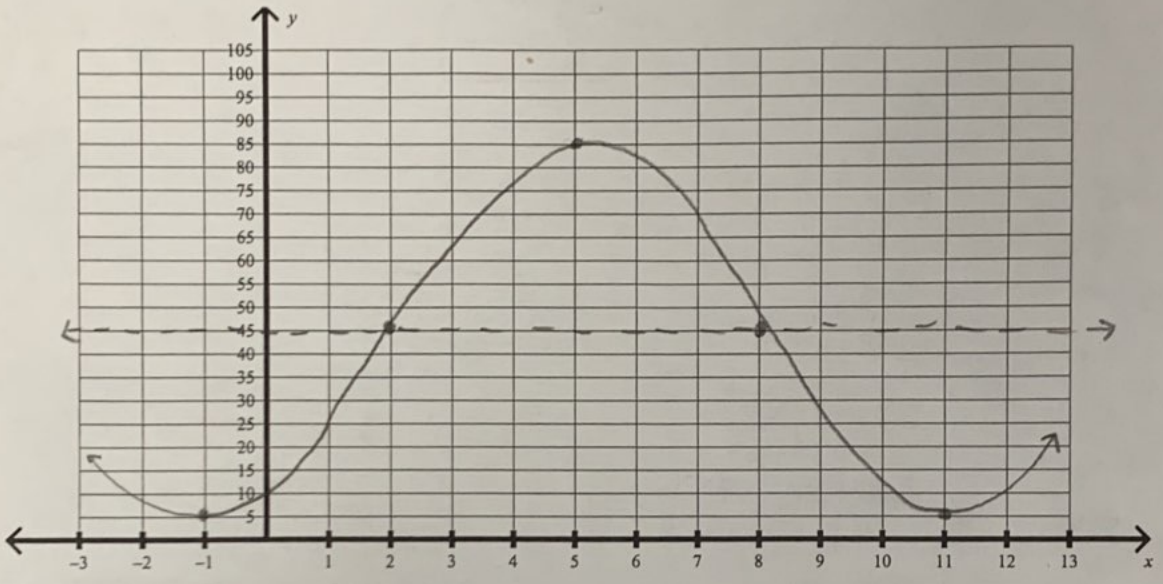
20
20

No Calculators!! Circle All Final Answers!! All answers in Exact Values!! Label!!

1. ***Ferris Wheel***: As you ride the Ferris wheel your distance from the ground varies sinusoidally with time. When the last seat is filled and the Ferris wheel starts, you notice it takes you 5 seconds to get to the top. The platform to load the chairs is 5 feet off the ground and the Ferris wheel towers at a height of 85 feet above the ground. You time the ride and you see that you made 5 revolutions in 1 min.

5 revolutions/min 1 revolution = 12 seconds per = 12 sec Int width = 3 sec K = 45 (5, 85)

1) Sketch one cycle of the graph of distances of your height from the ground.



2) What is the lowest you go as the Ferris wheel turns?

5 feet ; Ferris wheel will not hit the ground

$a = 40$ $\quad 12 = \frac{2\pi}{b}$ $\quad k = 45$

$b = \frac{\pi}{6}$

3) Write an equation of this sinusoidal.

$$f(x) = 40 \sin\left[\frac{\pi}{6}(x-2)\right] + 45$$

4) Predict your exact height above ground at:

a) 7 seconds

$$f(x) = 40 \sin\left[\frac{5\pi}{6}\right] + 45$$

$$= \frac{40}{1} \cdot \frac{1}{2} + 45$$

65 feet

b) 54 seconds

$$f(x) = 40 \sin\left[\frac{\pi}{6} \cdot \frac{54}{1}\right] + 45$$

$$= 40 \sin\left[\frac{2\pi}{3}\right] + 45$$

$$= \frac{40}{1} \cdot \frac{\sqrt{3}}{2} + 45$$

$20\sqrt{3} + 45$ feet

$\frac{26\pi}{3} - \frac{6\pi}{3} - \frac{6\pi}{3} - \frac{6\pi}{3} - \frac{6\pi}{3} = \frac{2\pi}{3}$

c) 9.5 seconds

$$f(x) = 40 \sin\left[\frac{\pi}{6} \cdot \frac{7.5}{1}\right] + 45$$

$$= \frac{40}{1} \cdot -\frac{\sqrt{2}}{2} + 45$$

$-20\sqrt{2} + 45$ feet

$\frac{7.5\pi}{6} = \frac{7\frac{1}{2}\pi}{6} = \frac{\frac{15}{2}\pi}{6} = \frac{15\pi}{12} = \frac{5\pi}{4}$

5) What is your exact height when the ride comes to a stop to start unloading the first riders?

$$f(x) = 40 \sin\left[\frac{\pi}{6}(0-2)\right] + 45$$

$\sin -\frac{\pi}{3}$

$$= \frac{40}{1} \cdot -\frac{\sqrt{3}}{2} + 45$$

$$= -20\sqrt{3} + 45 \text{ feet}$$