Math Xb Spring 2004

Lab 3: The Ferris Wheel Problem

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Name _____

Section Instructor _____

Collaborators _____

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   While spending a day at the fair, you decide to take a ride on the Ferris wheel. The Ferris wheel has a radius of 10 meters and makes one revolution every 2 minutes. Place the origin of a coordinate system at the center of the Ferris wheel, and suppose that at time $t = 0$ you are in a seat on the wheel at the point $(10, 0)$ going up.

1. Let $v(t)$ be your vertical position (that is, your height) at time t, where t is given in seconds. Let $h(t)$ be your horizontal position at time t, where t is given in seconds. Complete the following table of values. Estimate where necessary.
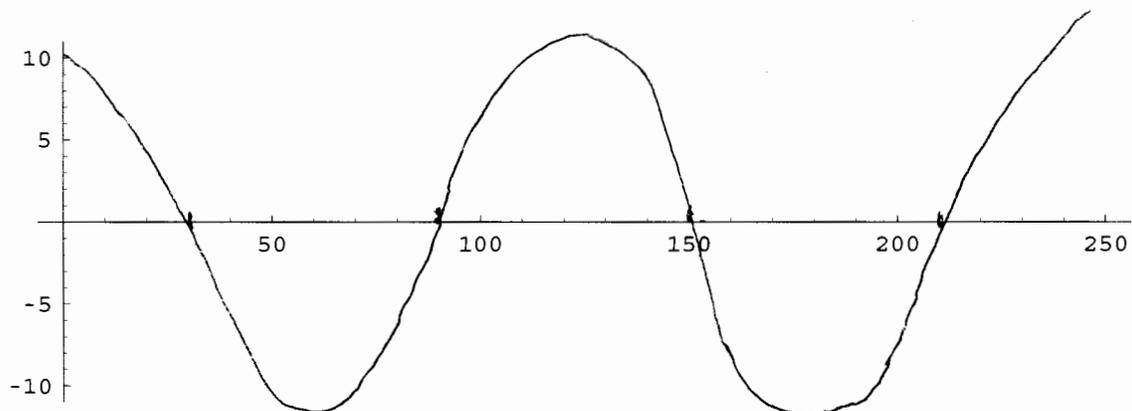
t	$v(t)$	$h(t)$
0	0	10
10	5	8.66
15	7	≈ 7
20	8.66	5
30	10	0
45	7	−7
60	0	−10
70	≈ −5	−8.66
80	−8.66	−5
90	−10	0
120	0	10
130	5	8.66
135	7	7
140	8.66	5
150	10	0
180	0	−10
240	0	10
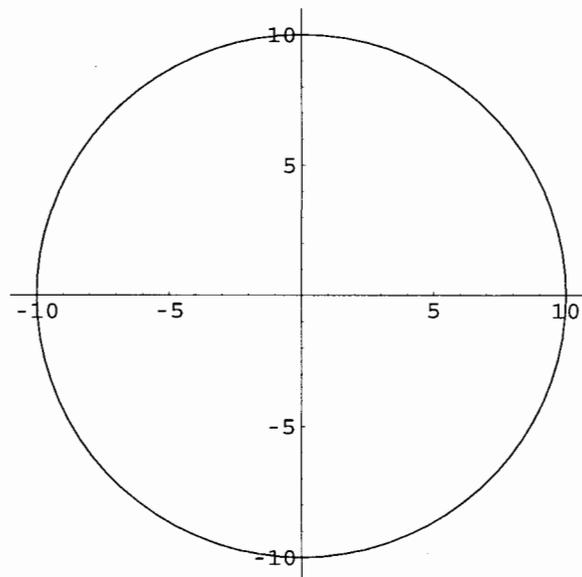
2. Sketch the graph of $v(t)$ from $t = 0$ to $t = 240$ on the set of axes below. Use your answers to Question 1 to help you do so.
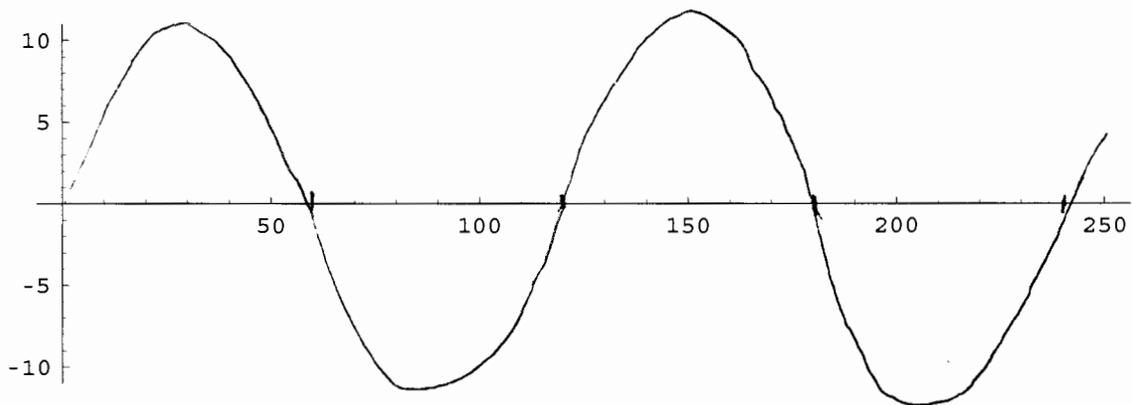
3. Sketch the graph of $h(t)$ from $t = 0$ to $t = 240$ on the set of axes below. Use your answers to Question 1 to help you do so.

4. At what times, $t \geq 0$, will you be at the point $(-10, 0)$?

$t = 60, \quad t = 180 \qquad t = 60n, \quad n \geq 1$ an integer

5. At what times, $t \geq 0$, will your horizontal position be 0?

$t = 30, 90, 150, 210 \qquad t = 30 + 60n, \quad n \geq 0$ an integer

6. Describe in words how the graphs of $v(t)$ and $h(t)$ would change if at time $t = 0$ you were at the point $(10, 0)$ going *down* instead of going *up*?

$h(t)$ would look the same. $v(t)$ would be flipped over the x-axis.