MATH ANALYSIS I HONORS
REVIEW ch 8.3 test
Trigonometric functions

NAME _____
DATE _____
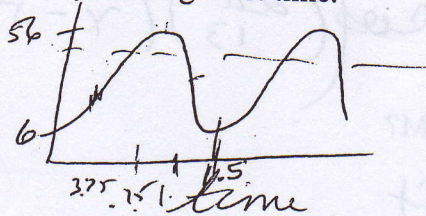PERIOD _____

ANS
Key

Scientific Calculator Only

1. A ferris wheel is 50 feet in diameter. Your height above the ground when you get on is 6 feet. It takes 1.5 minutes to make 1 revolution.

$A = 25$

$B = \dfrac{2\pi}{1.5} = \dfrac{4\pi}{3}$

$K = 31$

a) Draw a graph to represent your height vs. time.

b) Write an equation that represents this data.

$\left(\dfrac{2\pi}{1.5}\right)$

$$y = -25\cos\dfrac{4\pi}{3}x + 31$$

$$y = 25\cos\left(\dfrac{2\pi}{1.5}(x - .75)\right) + 31$$

c) Where will you be after 4.6 minutes?

$8.161 \, ft$

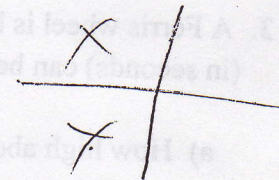d) When will you first be 45 feet above the ground?

.516 min

or

30.96 Seconds

e) How long will you stay 45 feet or more above the ground?

.51689 to .9831

.46621 min

27.97 second

2. At a certain dock, the high tide occurs at 5 AM and the water is a depth of 50 feet, while low tide occurs at 11:30 AM and the water is a depth of 10 feet.

   a) Draw a graph showing the depth of water at the dock as a function of the time after midnight.

   b) Find an equation of your graph.

   $$y = 20 \cos\left(\left(\frac{2\pi}{13}\right)(x-5)\right) + 30$$

   c) What is the depth of the water at 8AM?

   $$32.41 \, ft$$

   d) What is the depth of the water at 3:40 PM?

   $$38.568 \, ft$$

   e) In order to dock a large boat, the water needs to be at least 20 feet deep. During what time period after noon can the boat be safely docked?

   $$1.66 \, PM - 10.37$$

   $$1:40 \text{ to } 10:20$$

Graphing Calculator

3. A Ferris wheel is built such that the height h (in feet) above the ground of a seat on the wheel at time t (in seconds) can be modeled by the equation: $h(t) = 50\sin(\frac{\pi}{10}(t-5)) + 53$

   $$53$$
   $$3$$
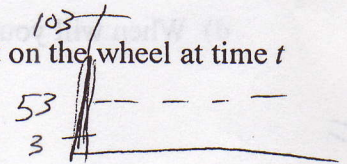
   a) How high above the ground is the top of the Ferris wheel?

   $\frac{2\pi}{1} \cdot \frac{10}{\pi} = 20$
   $\frac{\pi}{10}$

   $$103 \, ft$$

   b) After how many seconds will you reach the top of the Ferris wheel for the first time?

   $$10 \, sec$$

   c) How high above the ground is the lowest point the seat reaches?

   $$3 \, ft$$

   d) After getting on the Ferris wheel, when do you return to the lowest point?

   $$20 \, seconds$$

   e) During what time period will you be 80 feet or more above the ground for the first time?

   $$6.8 \text{ to } 13 \, seconds$$