MAT 161 Names_____
2.7 problems

1. Let $f(x) = \frac{1}{2}cos(2x)$. Find $f'(x), f''(x), and\ F(x)$.

2. Let $g(x) = x - cos\,x$.
   a. Does g have any stationary points on [0, 2π]? If so, where?

   b. Where in the interval [0, 2π] is g increasing?

   c. Find the maximum and minimum values of g on the interval [0, π].

   d. Where is g concave down on the interval [0, 2π]?

   e. Where is g increasing most rapidly. What is the value of g' at that point?

3. Find the following limit by recognizing the form. Explain how you arrived at your answer.

$$\lim_{h\to 0}\frac{\sin(\frac{\pi}{2}+h)-(1)}{h}$$

4. Let $f(x)=\cos x$ and $g(x)=\sqrt{3}\sin x$. Enter these functions on your calculator and look at the graph on the interval $[0,\pi]$. Write a function $h(x)$ that represents the vertical distance between $f(x)$ and $g(x)$.

   a) Find the maximum vertical distance between the functions on $[0,\pi]$ using calculus and your calculator. Support your response.

   b) Find the slopes of the tangent lines to f and g at the point on $[0,\pi]$ where the vertical distance between them is greatest.

   c) Find the exact value (not decimal approximation) for the solution to part a.