Quiz 2
Math 252

Name:

Show *all* your work (algebraically or geometrically) for each and simplify. No credit is given without supporting work.

1. [2] Carefully draw the graph of $\cos t$ on the interval $[-\pi, \pi]$ and use this graph to answer the following questions.

   (a) [1] Approximate $\int_0^{\frac{\pi}{2}} \cos t dt$, using two approximating rectangles and right endpoints.

   (b) [1] Evaluate $\int_0^{\frac{\pi}{2}} \cos t dt$ exactly.

   (c) [1] Find $\frac{d}{dx} \int_0^x \cos t dt$.

   (d) [1] Let $F(x) = \int_0^x \cos t dt$, graph $F(x)$.

2. [4] Mice astronauts are being sent up into space to live under the force of martian gravity known to be about 12 ft/s^2. One mouse astronaut throws a piece of cheese off the table 3 feet above the floor at an upwards speed of 1ft/s^2, when does the cheese reach its maximum height?

   source: http://science.nasa.gov/headlines/y2004/20jan_marsmice.htm

Extra Credit: Prove the following statement: If $f(x)$ is a continuous function on [a, b] and $F(x)$ is any antiderivative of $f(x)$, then

$$\int_a^b f(x)dx = F(b) - F(a)$$