Friday, November 30, 2012

Please work without books, notes, calculators, or any assistance from others. If you have any questions, feel free to ask me. Please do your work on separate paper; you should staple this sheet to your work (put this on top) and turn in everything together.

The first two questions are 15 points each, and the others are 14 points each.

(1) What is a *definite integral?*

(Your explanation should define the term, and should include equations, pictures, and/or English explanation as appropriate.)

(2) Find the point on the line $6x + y = 9$ that is closest to the point $(-3, 1)$.

(3) The graph of the velocity function of a particle is graphed below. Sketch the graph of its position function.

(4) Evaluate $\int_0^{\pi/4} \sec^2 t \, dt$.

(5) Evaluate $\int v(v^2 + 2)^2 dv$.

(6) Evaluate $\int_0^7 \sqrt{4 + 3x} \, dx$.

(7) Sketch the region enclosed by the following curves, and find its area:

$$y = 2 - \cos x, \quad y = \cos x, \quad x = 0, \quad x = 2\pi$$