Math 171 - Quiz 9

Name _____

November 11, 2010

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) On earth, the acceleration due to the force of gravity is given by $g = \dfrac{Gm}{r^2}$, where G is the gravitational constant, m is the mass of the earth, and r is the radius of the earth. Not worrying about the units, let's say G and m are measured exactly (no error):

$$G = 6.67428 \times 10^{-11} \quad \text{and} \quad m = 5.97370 \times 10^{24}.$$

Depending on how it is measured, the radius of the earth is between 6.357×10^6 and 6.378×10^6. Use the average of these two numbers as your value for the radius. Compute g, and use differentials to approximate the error in your value.

2. (3 points) Evaluate each indefinite integral.

(a) $\displaystyle\int (3x^2 - 7x)^2 \, dx$

(b) $\displaystyle\int [4\sin(2x) + 7\cos(3x)] \, dx$

3. (5 points) Let $f(x) = -x^2 + 3x - 2$. Your goal is to use 4 rectangles (of equal base length) to estimate the area of the region bounded between the graph of $y = f(x)$ and $y = 0$.

   (a) Under-estimate the area with rectangles underneath the curve. Draw the corresponding picture.

   (b) Over-estimate the area with rectangles above the curve. Draw the corresponding picture.