Math 217	**Sample Exam 2**	**Spring 2014**

1. [10 points] Suppose a sample of some radioactive element decays to 47% of its original amount in 5 days.

    1. What is the half-life of the element?
    2. If the sample contains 200g of the element initially, how much will be left after 8 days?

2. [10 points] Calculate TWO different Riemann sums for $f(x) = \sqrt{x}$ on the interval $[0, 6]$ using the partition $P = \{0, 2, 4, 6\}$. Draw a picture to explain what you are doing.

3. [10 points] Calculate the following.

$$\int x^5 \sqrt{1 + x^2}\, dx$$

4. [10 points] Use Fundamental Theorem of Calculus to find

$$\frac{d}{dx} \int_{1.23}^{x^2} \cos(t^2) dt$$

5. [10 points] (Logs and exps) Calculate the following:

    1. $$\frac{d}{dx} \left(\ln(\ln x) + 2^{\sin x} \right)$$
    2. $$\int \left(1 + \frac{1}{x} \right)^2 dx$$
    3. $$\int_2^3 \frac{dr}{r(\ln r)^2}$$

6. [10 points] Find the following

    1. $$\int_{-1}^{1} |1 - x| dx$$
    2. The area of the region bounded by the parabolas $y = x^2$ and $x = y^2$.