Second Round of Review Problems for Math 151 Final

1. Arrange A, B and C in order from least to greatest. Explain why.

$$A = \int_{-100}^{100} x \sin^2(x)\ dx \qquad B = \int_{0}^{100} x \sin^2(x)\ dx \qquad C = \int_{0}^{100} x\ dx$$

2. Compute $\int_{-2}^{4} |x| \sin(x^2)\ dx$.

3. Find the area bounded by the curves $y = x^2 - 10$ and $y = 2x - 2$.

4. Evaluate the integral $\int e^{5x} \sec(e^{5x})$.

5. Write the following expression in sum notation: $3 + 7 + 11 + 15 + 19 + \ldots + 83$.

6. The number of cars passing a parked cop car on a highway at a given time is given by $f(t) = (1+\sin(t^2))t$ (in cars per hour). What quantity is does the integral $\int_0^8$ represent? Evaluate this integral.

7. Compute $\sum_{n=1}^{100} \left(\frac{1}{n} - \frac{1}{n+1} \right)$.

8. A dart randomly strikes the unit square, which has corners $(0,0)$, $(1,0)$, $(0,1)$ and $(1,1)$. What are the chances that it strikes a point of the form (a,b) where $a^2 > b$?

9. Compute $\lim_{x \to \infty} \dfrac{\int_0^x e^{\sqrt{x}}\ dx}{e^x}$.

10. Find the area of the region lying to the right of $x = y^2 - 5$ and to the left of $x = 3 - y^2$.