Quiz #23

November 26, 2002

The summation rules:
\[
\sum_{i=1}^{n} 1 = n \quad \sum_{i=1}^{n} i = \frac{n(n+1)}{2} \quad \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \quad \sum_{i=1}^{n} i^3 = \left(\frac{n(n+1)}{2}\right)^2
\]

1. Pick one of these sums to compute. Make sure you indicate which one you want graded.
   
   (a) \[ \sum_{i=1}^{70} (2i^3 - 3) = \]
   
   (b) \[ \sum_{i=1}^{n} \left[ i^4 - (i-1)^4 \right] = \]

2. Find the Riemann sum for the function \( f(x) = \ln(x) \) on the interval \([2, 14]\). Use four equally spaced rectangles.
   
   (a) Use a left sum.
   
   (b) Use a right sum.

3. Use the integral properties and the information about \( f(x) \) to answer this question.

   \[
   \int_{0}^{1} f(x) \, dx = 1 \quad \int_{1}^{3} f(x) \, dx = 2 \quad \int_{0}^{1} (f(x))^2 \, dx = 3 \quad \int_{0}^{3} (f(x))^2 \, dx = 9
   \]
   
   \[ \int_{1}^{3} 2(f(x))^2 - 3f(x) + 1 \, dx = \]