

# Math 1a – Quiz 11

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November 22, 2005

1. (2 points) Between each pair of expressions, insert one of the symbols  $<$ ,  $>$ , or  $=$  to make a true statement. You may assume that  $n \geq 2$ .

$$(a) \quad \sum_{i=1}^n i \quad \sum_{i=1}^n n$$

$$(b) \quad \sum_{k=1}^n k \quad \sum_{k=1}^n (n - k)$$

2. (3 points) Let  $f(x) = \ln x$ . Give an expression that calculates the area under the graph of  $f(x)$  between  $x = 3$  and  $x = 10$  as the limit of a Riemann sum.

3. (3 points) Express the following limit as a definite integral. Do not evaluate the integral.

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{\pi}{n} \cos \left( \frac{\pi}{2} + \frac{i\pi}{n} \right)$$

4. (3 points) What is the area between the graph of  $y = \sin x$  and the  $x$ -axis, for  $x$  ranging from  $-\pi$  to  $0$ ?

5. (4 points) Compute the values of the following definite integrals.

(a)  $\int_{-8}^0 \sqrt{16 - (x + 4)^2} dx$

(b)  $\int_1^8 \sqrt[3]{x} dx$