MATHEMATICS 101 Section 201
Quiz #1, January 16, 2012
Show all your work. Use back of page if necessary. Calculators are not allowed.

Last Name: First Name: UBC Stud. No.:

For reference, you may need some or all of the following formulas

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2} \quad \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \quad \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4} \]

1) (5 marks) By evaluating the limit of Riemann sums obtained by using \( n \) equal-length subintervals and right endpoints (i.e. \( R_n \)), evaluate \( \int_{1}^{3} (x^2 + 3x) \, dx \). No credit will be given for a solution that uses antidifferentiation.

2) (3 marks) Evaluate

\[ I = \int_{-2}^{0} (x + 2) \, dx + \int_{0}^{2} \sqrt{4 - x^2} \, dx \]

by interpreting it in terms of areas. In other words, draw a picture (both integrals on one diagram) of the region the integrals represent, and find the area using high-school geometry. No credit will be given for a solution that uses antidifferentiation.

3) (2 marks) Suppose that \( f(x) \) is continuous. Write the following integrals as a single integral of the form \( \int_{a}^{b} f(x) \, dx \):

\[ \int_{-4}^{2} f(x) \, dx + \int_{2}^{7} f(x) \, dx - \int_{-4}^{-1} f(x) \, dx \]