Honors Calculus, Math 1450: 17957- Partial Assignment 4

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Due in class on 10/13/2017

1. Prove by induction that

   (a) $\sum_{j=1}^{n} j = \frac{n(n+1)}{2}$

   (b) $\sum_{j=1}^{n} j^2 = \frac{n(n+1)(2n+1)}{6}$

2. Use above results to show that $\int_0^a x \, dx = \frac{a^2}{2}$ and $\int_0^a x^2 dx = \frac{a^3}{3}$ by using Riemann sums consisting of partitions of $[0, a]$ into n equal subintervals of length $\frac{a}{n}$ and taking the limit as n goes to infinity. *Hint: Take the right endpoint as x_i^*.*