Note: you will need the results from A3 to complete this assignment.

1. Using mathematical induction, prove your solution to
   $$\sum_{i=1}^{n} i^3 = an^4 + bn^3 + cn^2 + dn + e.$$
2. Carefully sketch the graph of $y = x^3$ from $x = 0$ to $x = 2$ and show a sequence of n circumscribing rectangles starting and $x = 0$ to $x = 2$ whose heights are determined by the right-side of the rectangle meeting the curve and whose base has width $\frac{2}{n}$.
3. Derive an algebraic expression for the sum of the areas of the n rectangles you sketched.
4. Simplify the expression and collapse the open form sum to a rational function of n using the polynomial formula from assignment A3 or problem 1 above.
5. Take the limit of this rational function as $n \to \infty$.