(1) [10] Use the definition of the definite integral in the form

$$\int_a^b f(x)dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x$$

to determine

$$\int_0^2 (2 - x^2)\, dx$$

You may wish to recall the following special sums:

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2} \qquad \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \qquad \sum_{i=1}^{n} i^3 = \left[\frac{n(n+1)}{2}\right]^2$$

(2) [5] Now check your answer from question (1) by using the Fundamental Theorem of Calculus to evaluate

$$\int_0^2 (2 - x^2)\, dx$$