Homework: pp. 240-241 (4, 6, 10, 18)

In problem 4 and 6 calculate the Riemann sum \( \sum \limits_{i=1}^{n} f(\bar{x}_i) \Delta x_i \) for the given data.

4) \( f(x) = \frac{-x}{2} + 3 \); \( x_1 = 2, x_2 = -0.5, x_3 = 0, x_4 = 2 \)
\[ \sum \limits_{i=1}^{4} f(\bar{x}_i) \Delta x_i = f(-2)(-1.3+3) + f(0.5)(0+1.3) + f(0.9-0) + f(2)(2-0.9) \]
\[ = 4(1.7) + 3.25(1.3) + 3(0.9) + 2(1.1) = 15.925 \]

6) \( f(x) = 4x^3 + 1 \); \( [0, 3] \) is divided into six equal subintervals, \( \bar{x}_i \) is the right endpoint.
\[ \sum \limits_{i=1}^{6} f(\bar{x}_i) \Delta x_i = [f(0.5) + f(1) + f(1.5) + f(2) + f(2.5)] + f(3) ](0.5) \]
\[ = [1.5 + 5 + 14.5 + 33 + 63.5 + 109](0.5) = 113.25 \]

In problem 10, use the given values of \( a \) and \( b \) and express the given limit as a definite integral.

10) \( \lim \limits_{n \to 0} \sum \limits_{i=1}^{n} (\sin \bar{x}_i)^2 \Delta x_i \); \( a = 0, b = \pi \)
\[ = \int_{0}^{\pi} (\sin x)^2 \, dx \]
In 18, calculate \( \int_a^b f(x) \, dx \), where \( a \) and \( b \) are the left and right endpoints for which \( f \) is defined, by using the Interval Additive Property and the appropriate area formulas from plane geometry. Begin by graphing the given function,

\[
 f(x) = \begin{cases} 
 2x & \text{if } 0 \leq x \leq 1 \\
 2(x-1)+2 & \text{if } 1 < x \leq 2 
\end{cases}
\]

See the sketch of the graph. It is a triangle.

\[
 A = \frac{1}{2} \cdot b \cdot h \\
\frac{1}{2} \cdot (2) \cdot 4 = 4
\]