Examples 3.6 – Integrals of Polynomials

1. Evaluate the integrals.

   Solution:

   (a) $\int \left(5x^3 - 10x^2 + 3x - 1\right) dx =$

   (b) $\int \left(5x^{-3} - \frac{10}{x^2} + 3\sqrt{x}\right) dx =$

2. In Activity 2.6, we estimated the net area bounded by the graph of $f(x) = x^2$ on the interval [1, 3]. Use the fundamental theorem for polynomials to find the exact net area.

   Solution:

3. The function $T(h) = 9.5h^3 - 15.5h^2 + 17.4h - 10.12$ gives the rate of change of the air temperature in °F per hour during the first hour-and-a-half of a thunderstorm.

   (a) Evaluate and interpret $\int_0^{1.5} T(h)dh$.

   Solution:

   (b) If the thunderstorm began at 3:00 p.m. and the temperature was 85°F, then what does the answer to Part (a) tell us about the temperature at 4:30 p.m.? At 3:30 p.m.? Explain.

   Solution: