Math 136: Calculus 2

Spring 2017

Professor Levandosky

Written Homework 4

1. Let R be the region bounded by the curves $y = 4\sqrt{x}$ and $y = \sqrt{x}$ and the lines $x = 1$ and $x = 4$. Find the volume of the solid obtained by rotating R about each of the following axes.

   (a) The x-axis.

   (b) The line $y = -1$.

   (c) The y-axis.

   (d) The line $y = -1$.

2. Suppose that on some particular day the temperature in Worcester t hours after 6:00AM was given by $T(t) = 55 + 12\sin(\pi t/12)$. Find the average temperature on that day between 6:00AM and 6:00PM.

3. Use integration by parts to evaluate the following.

   (a) $\displaystyle\int x^2 e^{7x}\,dx$

   (b) $\displaystyle\int x^6 \ln(x)\,dx$

   (c) $\displaystyle\int e^x \cos(2x)\,dx$

   (d) $\displaystyle\int e^{\sqrt{x}}\,dx$

4. Use integration by parts to derive the following reduction formula:

$$\int \cos^n(x)\,dx = \frac{1}{n}\cos^{n-1}(x)\sin(x) + \frac{n-1}{n}\int \cos^{n-2}(x)\,dx$$