Math 151
In-class Worksheet

1. Compute the following

   (a) $\displaystyle\int_{-2}^{1} (3x^3 - x^2 + 2)\, dx$

   (b) $\displaystyle\int_{0}^{\pi/2} (\cos 5t + 7 \sin t)\, dt$

   (c) The area between the curve $y = 18 - 2x^2$ and the x-axis.

   (d) $\displaystyle\frac{d}{ds} \int_{\pi/6}^{s} t^2 \tan^3 t \, dt$

   (e) $\displaystyle\frac{d}{ds} \int_{s}^{\pi/6} t^2 \tan^3 t \, dt$

   (f) $\displaystyle\lim_{n\to\infty} \left(\sum_{i=1}^{n} \left[2 \sec^2 \left(\frac{\pi i}{4n} \right) \cdot \frac{\pi}{4n} \right] \right)$

2. A car is decelerating at a rate of 20 ft/sec^2 as a function of time t in seconds. If the car is going 90 ft/sec when the clock starts at $t = 0$, how far does the car move before it stops?

3. At the end of the school year, Chris is worn out from his coursework and takes a summer job on a local farm. His first task is to help design a set of pens for the livestock. To save on fencing, the three rectangular pens will be built in a row so that the middle pen shares a side with each of the two outer pens. Each pen needs to enclose 600 square yards of land. What dimensions should Chris put in his design to use the smallest possible length of fence?

4. A local television station is running a *Charmed* marathon, and Steve's Candy Store is buying ad time during the marathon. Market research shows that every time Steve airs his ad, he gains 1,000 new customers. However, once the ad airs t times, a total of $20t^2$ of these potential customers have become so sick of the ad that they vow never to shop at Steve's. How many ads should Steve run to get the most new customers?

5. Let $f(x) = x^2 - 3$. Compute the Riemann sum on the interval $[-2, 10]$...

   (a) ... with 3 pieces and midpoints.

   (b) ... with 4 pieces and right endpoints.