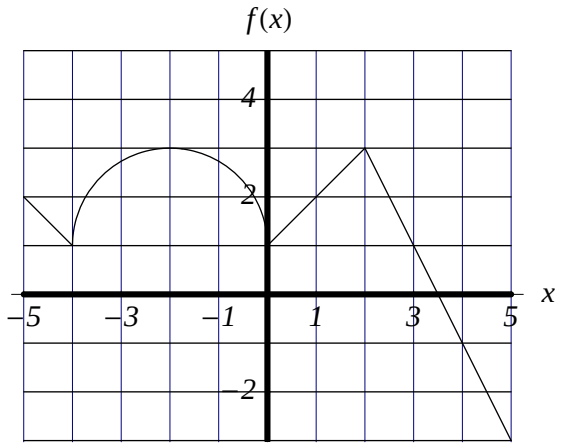
Math 1a. §5.2 Worksheet
The Definite Integral

Fall 2005

1. Given the graph of f below, estimate $\int_{-5}^{5} f(x)\,dx$ with five subintervals using a right hand sum, left hand sum, and a midpoint sum.



2. Evaluate $\int_0^3 \sqrt{9-x^2}+2\,dx$ using areas.

3. Show that

$$\frac{\pi}{6} \leq \int_{\pi/6}^{\pi/2} \sin x \, dx \leq \frac{\pi}{3}$$

using the properties of the definite integral.

4. Use the definition of the integral to evaluate

$$\int_1^4 x^2 + 2x - 5 \, dx.$$

You may find one of more of the following formulas useful.

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