5.8 Use L'Hospital's rule to evaluate the following limits:

$$\lim_{x\to 1}\frac{\sin(1-x)}{x^2-1} \qquad \lim_{x\to 0}\frac{x}{\sin(\pi x)}$$

$$\lim_{x\to\infty}\frac{\log(x)}{x} \qquad \lim_{x\to\infty}\frac{3^x}{x^3}$$

$$\lim_{y\to 0}\frac{e^y\sin(y)}{\log(1-y)} \qquad \lim_{y\to 0}\frac{(\sin(y))^2-\sin(y^2)}{y}$$

$$\lim_{y\to\infty}\frac{3e^y}{y^3} \qquad \lim_{x\to\infty}\frac{x\log(x)}{x+\log(x)}.$$

5.9 Using the limit of Riemann integrals, calculate the following integrals. Show steps.

$$R=\int_2^3\sqrt{x}dx \qquad R=\int_1^9\frac{1}{1+y^2}dy$$

$$R=\int_0^{0.1}x^2dx \qquad R=\int_1^9 1dx.$$

5.10 Solve the following definite integrals using the antiderivative method.

$$\int_6^8 x^3dx \qquad \int_1^9 2y^5dy \qquad \int_{-1}^0(3x^2-1)dx$$

$$\int_{-1}^1(14+x^2)dx \qquad \int_1^2\frac{1}{t^2}dt \qquad \int_2^4 e^ydy$$

$$\int_{-1}^2 x\sqrt{1+x^2}dx \qquad \int_{-100}^{100}(x^2-2/x)dx \qquad \int_2^4\sqrt{t}dt.$$

5.11 Calculate the area of the following function that lies above the x-axis and over the domain $[-10,10]$:

$$f(x)=4x^2+12x-18.$$

5.12 In Figure 5.8, the fourth and fifth voters have ideal points at 7.75 and 8.5, respectively, and $\omega_4=40$, $\omega_5=10$. Calculate the area of the overlapping region above the x-axis.