Concepts of Integration
Tuesday, June 27

1. Let

$$K = \int_3^{16} e^x dx$$

   (a) Give an estimate for K using left endpoints with $\Delta x = 1$.
   (b) Give an estimate for K using right endpoints with $\Delta x = 1$.
   (c) Which of the above estimates is ckoser to K?
   (d) Give an estimate for K using midpoints with $\Delta x = .1$.
   (e) Give an exact expression for K.

2. Prove, or Disprove and Salvage:

   (a) $0 < \int_0^a e^{-x^2} dx < a$
   (b) $\int_0^\pi sin(x^2)dx < 0$
   (c) $\int_{-\pi}^{\pi} e^{-x^2/\sqrt{2}}dx = 2\int_0^\pi e^{-x^2/\sqrt{2}}dx$
   (d) $\int_0^1 \frac{1}{\sqrt{1+x^4}}dx < \int_1^2 \frac{1}{\sqrt{1+x^4}}dx$
   (e) $\int_{-3}^{3} \frac{x}{1+x^4}dx > 0.001$
   (f) The area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is greater than $2ab$ and less than $4ab$.
   (g) If $f(x)$ is continuous for all x then $\int_a^b f(x+c)dx = \int_{a+c}^{b+c} f(x)dx$