1. Compute the value of each of the following integrals.

$$\int_{1}^{\infty} \frac{5}{x^8} \, dx$$

$$\int_{0}^{\infty} x^2 e^{-x^3} \, dx$$

2. Show whether each of the following converges or diverges. Use an explicit inequality (< or >) to justify your choice.

$$\int_{1}^{\infty} \frac{5x + x^2}{7x^2 + 2x^3} \, dx$$

$$\int_{0}^{1} \frac{1}{\sqrt{x + x^{10}}} \, dx$$

3. Write (but do not evaluate) an integral that gives the volume of a cone of radius 3 inches and height 8 inches.