Math 152, Fall 2007, Week 3

1. Calculate four of the following integrals:

\[ \int x \cos x^2 \, dx \quad \int x^2 \cos x^2 \, dx \quad \int x^2 \cos x \, dx \quad \int x^2 \cos^2 x \, dx \quad \int x \cos^2 x \, dx \]

2. Let \( R \) be the region enclosed by the curves \( y = \ln x, y = 0, x = 1 \) and \( x = e \). Find the area of \( R \), the volume resulting if \( R \) is revolved about the \( x \)-axis, and the volume resulting if \( R \) is revolved about the \( y \)-axis.

3. Use appropriate trig substitutions to evaluate:

a) \[ \int \sqrt{4 - x^2} \, dx \]

b) \[ \int \sqrt{4 + x^2} \, dx \]

c) \[ \int \sqrt{5 + 2x + x^2} \, dx \]