April 6, 2007
Answer Question Section 9.4

Problem #7
\[ \int \frac{\sin x}{2 + \cos x} \, dx \]
\[ u = 2 + \cos x \]
\[ du = -\sin x \, dx \]
\[ -du = \sin x \, dx \]
\[ \int \frac{\sin x}{2 + \cos x} \, dx = \int -\frac{1}{u} \, du = -\ln |u| + C = -\ln |2 + \cos x| + C \]

Problem #11
\[ \int x \cos x \, dx \]
\[ u = x \quad dv = \cos x \, dx \]
\[ du = dx \quad v = \sin x \]
\[ \int x \cos x \, dx = x \sin x - \int \sin x \, dx = x \sin x - (-\cos x) + C = x \sin x + \cos x + C \]

Problem #15
\[ \int_{0}^{\pi/3} \sin x \, dx = \left[ -\cos x \right]_{0}^{\pi/3} = \left[ -\cos \frac{\pi}{3} \right] - \left[ -\cos 0 \right] = -\frac{1}{2} + 1 = \frac{1}{2} \]

Section 8.5
Approximation for the change in \( z \) as \( x \) moves from \( a \) to \( a + dx \) and \( y \) moves from \( b \) to \( b + dy \) is \( dz = f_x(a, b) \, dx + f_y(a, b) \, dy \)