

## CALCULUS 1501 WINTER 2010

### HOMEWORK ASSIGNMENT 2.

Due January 22.

2.1. First use a substitution, then integration by parts to evaluate

$$\int \sin(\ln x) dx.$$

2.2. Evaluate

$$\int_0^{\pi} e^{\cos t} \sin 2t dt.$$

2.3. Use integration by parts to prove the reduction formula

$$\int \sec^n x dx = \frac{\tan x \sec^{n-2} x}{n-1} + \frac{n-2}{n-1} \int \sec^{n-2} x dx.$$

2.4. Evaluate

$$\int \frac{\sin x}{\cos^3 x} dx.$$

2.5. Evaluate

$$\int \frac{dx}{\sin x - 1}.$$

2.6. Let

$$I_n = \int_0^{\pi/2} \cos^n x dx.$$

(i) Prove that  $I_n = \frac{n-1}{n} I_{n-2}$ .

(ii) Using the reduction formula from part (i), evaluate  $\int_0^{\pi/2} \cos^8 x dx$ .

2.7. Evaluate

$$\int (\cos^{-1} x)^2 dx.$$

Here  $\cos^{-1} x = \arccos x$  is the inverse function to  $\cos x$ . (*Hint:* Use integration by parts twice.)