Honors Math 182 Homework 4 Version B

1. Find decimal approximations to the following definite integrals to at least 5 digit accuracy:

(i) $\displaystyle\int_0^e e^{2x} \sin e^x \, dx$

(ii) $\displaystyle\int_0^1 \sqrt{x^2 + 2x + 2} \, dx$

(iii) $\displaystyle\int_1^3 \frac{\sin 2x}{x} \, dx$

(iv) $\displaystyle\int_0^\pi \cos(x^2) \, dx$

2. Make the substitution $u = \sin x$ in the following integrals, but DO NOT SOLVE THEM!

(i) $\displaystyle\int_0^{\pi/6} \sin x \, dx$

(ii) $\displaystyle\int_0^{\pi/4} x \, dx$

3. Define

$$S(x) = \int_0^x \sin(t^2)\, dt \qquad \text{and} \qquad C(x) = \int_0^x \cos(t^2)\, dt$$

Find the following derivatives. Your answer may include the functions S and C.

(i) $\dfrac{d}{dx}\big(S(2x)\big)$

(ii) $\dfrac{d}{dx}\big(x\, C(x^2)\big)$