

# Homework Set 6

(sect 5.5: U-Substitution)

Evaluate the indefinite integrals.

1.  $\int \cos 3x \, dx$

2.  $\int e^{\sin x} \cos x \, dx$

3.  $\int x e^{x^2} \, dx$

4.  $\int \frac{e^x}{e^x+1} \, dx$

5.  $\int \frac{1+x}{1+x^2} \, dx$

Evaluate the definite integrals.

6.  $\int_0^2 (x-1)^{25} \, dx$

7.  $\int_0^1 x^2(1 + 2x^3)^5 dx$

8.  $\int_e^{e^4} \frac{1}{x\sqrt{\ln x}} dx$

9.  $\int_{-2}^2 (x + 3)\sqrt{4 - x^2} dx$  [hint: write as two integrals and evaluate one of them in terms of area]

10. A bacteria culture starts with an initial population of 400 bacteria and grows at a rate of  $r(t) = (450.268)e^{1.12567t}$  bacteria per hour. How many bacteria will there be after 3 hours?