# ECO137 (3) Homework Questions for Chapter 9 Integration part 2

1. Suppose that the demand and supply curves are P=200-0.2Q and P=20+0.1Q, respectively. Find the equilibrium quantity and compute the consumer and producer surplus.

2. Suppose the demand and supply curves are P=6000/(Q+50), P=Q+10. Find the equilibrium price, and compute the consumer and producer surplus.

3. Use integration by parts to find the followings:

(a) $\int xe^{-x}\,dx$   (b) $\int 3xe^{4x}\,dx$   (c) $\int (1+x^2)e^{-x}\,dx$   (d) $\int xlnx\,dx$

4. Use integration by substitution to find the followings:

(a) $\int x(2x^2+3)^5\,dx$   (b) $\int x^2 e^{x^3+2}\ \ dx$ (c) $\int \frac{\ln(x+2)}{2x+4}\,dx$ (d) $\int \frac{x^3}{(1+x^2)^3}\,dx$

5. Use integration by substitution to find the followings:

(a) $\int_0^1 x\sqrt{1+x^2}\,dx$   (b) $\int_1^3 \frac{1}{x^2}e^{2/x}\,dx$

6. Determine the following integrals, if they converge. Indicate those that diverge.

(a)$\int_1^\infty \frac{1}{x^3}\,dx$   (b) $\int_1^\infty \frac{1}{\sqrt{x}}\,dx$ (c) $\int_{-\infty}^0 e^x\,dx$

7. Examine the convergence of $\int_0^1 \frac{\ln(x)}{x^3}\,dx$ $and$ $\int_1^\infty \frac{\ln(x)}{x^3}\,dx$.