

EE 422 Mathematical Economics 2 (Semester 1 / 2016)

Assignment 1

The due date for this assignment is (Fri) August 26th.

1. Which of the following integrals are improper, and why? (30 points)

(a) $\int_0^{\infty} e^{-rt} dt$

(b) $\int_2^3 x^4 dx$

(c) $\int_0^1 x^{-2/3} dx$

(d) $\int_{-\infty}^0 e^{rt} dt$

(e) $\int_1^5 \frac{dx}{x-2}$

(f) $\int_{-3}^4 6 dx$

2. Evaluate all the improper integrals in Question 1. (20 points)

3. Show that (20 points)

(a) Given the marginal propensity to import $M'(Y) = 0.1$ and the information that $M = 20$ when $Y = 0$, find the import function $M(Y)$.

(b) Given the marginal propensity to consume $C'(Y) = 0.8 + 0.1Y^{-1/2}$ and the information that $C = Y$ when $Y = 100$, find the consumption function $C(Y)$.

4. Assume the rate of investment is described by the function $I(t) = 12t^{1/3}$ and that $K(0) = 25$. (10 points)

(a) Find the time path of capital stock K .

(b) Find the amount of capital accumulation during the time intervals $[0,1]$ and $[1,3]$, respectively.

5. Given a continuous income stream at the constant rate of \$ 1,000 per year (10 points):

(a) What will be the present value Π if the income stream lasts for 2 years and the continuous discount rate is 0.05 per year?

(b) What will be the present value Π if the income stream terminates after exactly 3 years and the discount rate is 0.04?

6. What is the present value of a perpetual cash flow of (10 points):

(a) \$ 1,450 per year, discounted at $r = 5\%$?

(b) \$ 2,460 per year, discounted at $r = 8\%$?