

ECON3120/4120 – Mathematics 2, spring term 08: **Problems for seminar 2, Feb. 11–14**

1 Ma I: 10.1.2 (c) and (e). (EMEA: 9.1.4 (c) and (e).)

2 Ma I: 10.6.1 (d). (EMEA: 9.5.1 (d).)

3 Ma I: 10.7.2 (c). (EMEA: 9.6.2 (c).) (Hint: Perform a fairly bold substitution.)

4 Find the integrals:

$$(a) \int \frac{x}{1+x^2} dx \quad (b) \int_0^1 (1-2x)^{50} dx \quad (c) \int_1^{e^2} \sqrt{x} \ln x dx$$

5 Evaluate $\int_0^2 2x^2(2-x)^2 dx$. Give a rough check of the answer by sketching the graph of $f(x) = 2x^2(2-x)^2$ over $[0, 2]$.

6 Consider the function f defined by

$$f(x) = x(\ln x)^2, \quad x > 0$$

(a) Compute $f'(x)$ and $f''(x)$.

(b) Decide where f is increasing and where f is decreasing. Does f have global extreme points?

(c) Find $\int x(\ln x)^2 dx$.