

ECON3120/4120 Mathematics 2, autumn 2008

Problems for Seminar 2, 8–12 September

1 Find the following limits:

$$(a) \lim_{x \rightarrow 0} \frac{e^x - 1 - x - \frac{1}{2}x^2}{3x^3} \quad (b) \lim_{x \rightarrow 7} \frac{\sqrt[3]{x+1} - \sqrt{x-3}}{x-7}$$

2 The following equation system defines $u = u(x, y)$ and $v = v(x, y)$ as C^1 functions of x and y around the point P where $(x, y, u, v) = (1, 1, 1, 1)$:

$$\begin{aligned} 2uv + v^2 &= 2x + y \\ u - v &= x^2 - y^2 \end{aligned}$$

(a) Differentiate the system. Then find the values of $\partial u/\partial x$, $\partial u/\partial y$, $\partial v/\partial x$ and $\partial v/\partial y$ at the point P .

3 Assume that the marginal cost function of a firm is

$$C'(x) = x^2 + x - 10$$

and that the fixed costs are 50. Find the cost function.

Problems from the textbook:

MA I: 11.10.4, 11.10.5(b), 12.6.2.

EMEA: 12.2.8, 12.2.9(b), 12.11.3 (12.2.7, 12.2.8(b), 12.11.3 in the 2nd edition).