

MATHEMATICS 2

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Exam

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Lastname Name

1) (10 p.ts) Solve the following integral

$$\int e^x \ln(1 + e^x) dx$$

2) (10 p.ts) Given the following linear system

$$\begin{cases} x & +y & +kz = 2 \\ x & +y & +3z = k - 1 \\ 2x & +ky & -z = 1 \end{cases}$$

discuss and find solutions as k changes.

3) (10 p.ts) Find local maxima and minima of the function

$$f(x, y) = xy$$

in the region

$$C = \{(x, y) \in \mathbb{R}^2 : y = 3x^2 - 4x - 1\}$$