

# Exercise

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TUM Department of Informatics

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# Deep Learning

## Problem 1:

$$y = \log \sum_{i=1}^N e^{x_i} = a + \log \sum_{i=1}^N e^{x_i - a}$$

$$e^y = \sum_{i=1}^N e^{x_i}$$

$$e^y e^{-a} = e^{-a} \sum_{i=1}^N e^{x_i}$$

$$e^{y-a} = \sum_{i=1}^N e^{x_i} e^{-a}$$

$$\log e^{y-a} = \log \sum_{i=1}^N e^{x_i} e^{-a}$$

$$y - a = \log \sum_{i=1}^N e^{x_i}$$

$$y = a + \log \sum_{i=1}^N e^{x_i - a}$$

## Problem 2:

## Problem 3:

# Appendix

We confirm that the submitted solution is original work and was written by us without further assistance.  
Appropriate credit has been given where reference has been made to the work of others.

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