

Exam exercises**Problem 1.**

Consider the function given by $f(x) = 0,60 \ln(1+x) + 0,40 \ln(1-x)$, defined for $0 \leq x < 1$.

- (6p) Find the maximum point $x = x^*$ and the maximum value $y = f(x^*)$ of f .
- (6p) Determine whether f is convex or concave.
- (6p) Show that $f(x) < 0$ when $x > 2x^*$.
- (6p) Sketch the graph of f .

For a complete solution manual, see Eksamen MET11803 05/2017, Oppgave 1.

Problem 2.

We consider the function given by

$$f(x) = \frac{e^{1-\sqrt{x}}}{\sqrt{x}}, \quad x > 0$$

- Compute $f'(x)$.
- Show that f is decreasing in the the area of definition $D_f = (0, \infty)$.
- Determine the limits

$$\lim_{x \rightarrow 0^+} f(x) \quad \text{and} \quad \lim_{x \rightarrow \infty} f(x)$$

- Make a rough sketch of the graph of f , based on what you have found out above, and mark the area between the graph of f and the x -axis (for $x > 0$) in the sketch.

For a complete solution manual, see Eksamen MET11803 12/2018, Oppgave 3.