Name:

Kennitala:

Explain your solution concisely but clearly. Include all derivation steps. Make sure a fellow student would be able to understand what you mean.

1. Find the largest possible volume V of a cylindrical metal can having a given surface area A.

Solution:

2. Consider the function

$$f(x) = \sqrt{\frac{1}{3 + e^x}}$$

   1. Find a Taylor approximation of this function around 0 up to order 2.
   2. Use the result to approximate $f(0.3)$. How many decimal digits are correct in the approximation?

Solution:

3. Consider the function

$$f(x) = \arctan x + ax$$

   1. For what values of a does this function have a local minimum?
   2. Find the (x, y) coordinates of the local minimum in terms of a.

Solution: