

**Midterm 3**  
**14.01.10**

**Name:**

**Exercise 1.** Compute the derivative of the following function:

$$f(x) = \frac{x}{x^2 + 1}.$$

**Solution:**

**Exercise 2.** Compute the derivative of the following function:

$$f(x) = e^x \cdot \log(x).$$

**Solution:**

**Exercise 3.** Compute the limit:

$$\lim_{x \rightarrow 1} \frac{\log(x)}{x - 1}.$$

**Solution:**

**Exercise 4.** Find the maximal and minimal values of the following function on the given interval:

$$f(x) = x^2 + 2x + 21, \quad [-2, 7].$$

**Solution:**

**Exercise 5.** Compute the integral:

$$\int x^2 e^x dx.$$

**Solution:**

**Exercise 6.** Compute the integral:

$$\int \frac{x^2}{1+x^3}.$$

**Solution:**