

## Quiz # 3

**Problem 1.** Give the definition of a uniformly continuous function.

**Definition.** A function  $f$  is uniformly continuous on (an interval)  $I$  if for every  $\varepsilon > 0$  there exists  $\delta > 0$  such that for every  $x, y \in I$  with  $|x - y| < \delta$  one has  $|f(x) - f(y)| < \varepsilon$ .

**Problem 2.** Differentiate

$$\int_{x^2}^1 e^t dt.$$

**Solution.**

$$\frac{d}{dx} \int_{x^2}^1 e^t dt = -e^{x^2} \frac{d}{dx} x^2 = -2xe^{x^2}.$$

**Problem 3.** Find

a.  $\log_3 27$       b.  $\log_4 \frac{1}{16}$       c.  $\ln(\sqrt{e} x^2) - 2 \ln x$

**Solution.**

a.  $\log_3 27 = \log_3 3^3 = 3,$

b.  $\log_4 \frac{1}{16} = \log_4 4^{-2} = -2,$

c.  $\ln(\sqrt{e} x^2) - 2 \ln x = \ln e^{1/2} + \ln x^2 - \ln x^2 = \frac{1}{2}.$