

**Math 262**  
**Practice Exam no.1**

**Problem 1**

$$y = \left( \frac{3}{2} \tan^{-1} x + C \right)^{2/3}$$

**Problem 2**

$$y = C e^{\sin x} - 1$$

**Problem 3**

$$y = \int \frac{x}{\sqrt{C_1 - 2x}} dx .$$

After the substitution one obtains

$$y = \frac{1}{6}(C_1 - 2x)^{3/2} - \frac{C_1}{2}(C_1 - 2x)^{1/2} + C_2$$

**Problem 4**

$$t_d = 5 \frac{\ln 2}{\ln 3}$$

**Problem 5**

$$y = C_1 e^{-2x} + C_2 e^{2x} - e^x \left( \frac{1}{10} \cos x + \frac{1}{5} \sin x \right)$$

**Problem 6**

$$y = -2e^{-3t} + e^{-2t}$$

The time at which the system passes through equilibrium is

$$t = \ln 2$$

**Problem 7**

$$x e^x \sin 2y + 2y \cos x = \text{const}$$

**Problem 8**

$$u' = \sqrt{t}, \quad u = \frac{2}{3} t^{3/2} \quad y = \frac{2}{3} \sqrt{t}$$

**Problem 9** Assume  $x > 0$ , then

$$y = \frac{Ax^2}{1 - Ax}$$

**Problem 10**

$$T(t) = 130e^{-kt} + 70$$

$$t = \frac{\ln \frac{13}{8}}{\ln \frac{13}{12}}$$