

$$1) \quad y'(x) + y(x) = 4e^x \quad (20p)$$

$$2) \quad y'(x) = x \sqrt[5]{y(x)} \quad y(1) = 1 \quad (15p)$$

$$\left(\frac{h}{5} \ln|x| + c \right)^{\frac{5}{h}}$$

$$e^{-x} \cdot hx + c$$

$$3) \quad 2xy(x)^3 + 1 + 3x^2y(x)^2y'(x) = 0 \quad y(1) = 2 \quad (15p)$$

$$4) \quad y''(x) = hy(x)y'(x) \quad y(1) = 1 \quad y'(1) = 2 \quad (20p)$$

$$5) \quad y'(x) + \frac{2}{x}y(x) + y(x)^2 = \frac{2}{x^2} \quad y(1) = 0 \quad (30p)$$

$$y(x) = \frac{1}{x} \quad x > 0$$

1. Oldja meg az $y'(x) + y(x) = 4e^x$ differenciálegyenletet! (20 pont)

2. Oldja meg az

$$y'(x) = x\sqrt[5]{y(x)}$$

$$y(1) = 1$$

Cauchy-feladatot! (15 pont)

3. Oldja meg a

$$2xy(x)^3 + 1 + 3x^2y(x)^2y'(x) = 0$$

$$y(1) = 2$$

Cauchy-feladatot! (15 pont)

4. Oldja meg az

$$y''(x) = 4y(x)y'(x)$$

$$y(1) = 1$$

$$y'(1) = 2$$

Cauchy-feladatot! (20 pont)

5. Oldja meg az

$$y'(x) + \frac{2}{x}y(x) + y(x)^2 = \frac{2}{x^2}$$

$$y(1) = 0$$

Cauchy-feladatot! A differenciálegyenlet egy megoldása: $y(x) = \frac{1}{x}$, $x > 0$. (30 pont)

