Antti Auranen 18.2.2019

Insinöörimatematiikka D Demot 2019

1 Demo 6 19.2.2018

1.1 5.

$$\begin{aligned} y' = y^2x^3 <=> \frac{dy}{dx} &= y^2x^3 \\ <=> \frac{1}{y^2}dy &= x^3dx \\ <=> \int \frac{1}{y^2}dy &= \int x^3dx + C \\ <=> -\frac{1}{y} &= \frac{1}{4}x^4 + C \\ <=> y &= -\frac{4}{x^4} + C, x \neq 0 \end{aligned}$$

1.2 6.

$$\begin{aligned} y' = xe^{-4} <=> e^4dy &= xdx \\ <=> \int e^4dy &= \int xdx + C \\ <=> e^4 &= \frac{1}{2}x^2 + C \\ <=> y &= ln(\frac{1}{2}x^2 + C) \end{aligned}$$

1.3 7.

$$\begin{aligned} y' = (x+1)(y+1) <=> \frac{dy}{dx} &= (x+1)(y+1) \\ <=> \frac{1}{y+1}dy &= (x+1)dx \\ <=> \int \frac{1}{y+1}dy &= \int (x+1)dx + C \\ <=> ln(y+1) &= \frac{1}{2}x^2 + x + C \\ <=> y + 1 &= e^{\frac{1}{2}x^2+x+C} \\ <=> y &= e^{\frac{1}{2}x^2+x+C} \end{aligned}$$