# 15.21

lördag 24 december 2022 11:08

a)

$$\int y \cdot dy = -\int x\, dx$$

$$\frac{y^2}{2} = -\frac{x^2}{2} + C \qquad y^2 = -x^2 + C$$

$$\underline{y = \sqrt{-x^2 + C}}$$

b)

$$y' \cdot e^{-y} = e^x$$

$$\int e^{-y}\, dy = \int e^x\, dx$$

$-C$

$$-e^{-y} = e^x + C \qquad y = -\ln(-e^x + C_1)$$

c)

$$\int \frac{1}{y^2}\, dy = \int 1\, dx$$

$$-\frac{1}{y} = x + C \qquad y = -\frac{1}{x+C} \qquad 1 = -\frac{1}{1+C} \qquad C = -2$$

Sv: $y = -\frac{1}{x-2}$

d)

$$\int \frac{1}{y^2}\, dy = \int 1\, dx$$

$$-\frac{1}{y} = x + C \qquad y = -\frac{1}{x+C} \qquad 0 = -\frac{1}{1+C} \qquad C = \infty$$

Sv: $y = 0$

e)

$$x^2 y \cdot y' = 1 + x^2$$

$$y \cdot y' = \frac{1+x^2}{x^2} = \frac{1}{x^2} + 1$$

$$\int y\, dy = \int \frac{1}{x^2} + 1\, dx$$

$$\frac{y^2}{2} = -\frac{1}{x} + x + C$$

$$y^2 = -\frac{2}{x} + 2x + 2C \qquad y = \sqrt{-\frac{2}{x} + 2x + 2C}$$

$$2 = \sqrt{-1 + 4 + 2C} \qquad C = 1/2$$

$$\underline{y = \sqrt{-\frac{2}{x} + 2x + 1}}$$