

S4 GROUPE n

ETU003235: ANDERSON Soamiavaka Vanille
ETU003247: ANDRIANAJA Onja Fanilo
ETU003286: RABETOKOTANY Yvan Noah
ETU003298: RAJAONARIVONY Tandrifiniaina Dylan
ETU003305: RAKOTOARIVONY Loïc Dylan
ETU003331: RANAIVOSON Miora Randie
ETU003335: RANDRIAMAHEFA Liantsoa Alicia
ETU003348: RANDRIANIRINA Niriela Andraina
ETU003363: RATSITO Oelirivo Mitia
ETU003378: RAZAKANDISA Sariaka Niaina

Exercice 1:

1. $y' = \sin(y)$

2. $x^2 y' = e^y$

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$$x^2 \frac{dy}{dx} = e^y$$

$$\frac{dy}{e^y} = \frac{dx}{x^2}$$

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

$$\int e^{-y} dy = \int x^{-2} dx$$

$$-e^{-y} = -\frac{1}{x} + C, \quad C \in \mathbb{R}$$

$$\ln(e^{-y}) = \ln\left|\frac{1}{x} + C\right|$$

$$-y = \ln\left|\frac{1}{x} + C\right|$$

$$y = -\ln\left|\frac{1}{x} + C\right|$$

$y = -\ln\left|\frac{1}{x} + C\right|$

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

4. $y' + y = 2e^x + 4 \sin(x)$

5. $y' - 2y = 2x^3 + x$ ou $y(3) = 1$

6. $y' + 2xy = e^{x-x^2}$

7. $y' \cos(2y) - \sin(y) = 0$

8. $y' - 2y = 2x^3 + x$ ou $y(3) = 1$

Exercice 2:

1. $xy' = y + 3xy^2$

2. $y' + \frac{y}{x+1} = \frac{1}{2}(x+1)^3y^3$

3. $y'(1 - \sin(x) \cos(x)) + y^2 \cos(x) - y' + \sin(x) = 0$
Si $y = \cos(x)$ est une solution particuliere

4. $y = xy' + (y')^3$