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

$\left(y' + \frac{2xy}{x^2+1} = x+1\right) x^2+1$

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

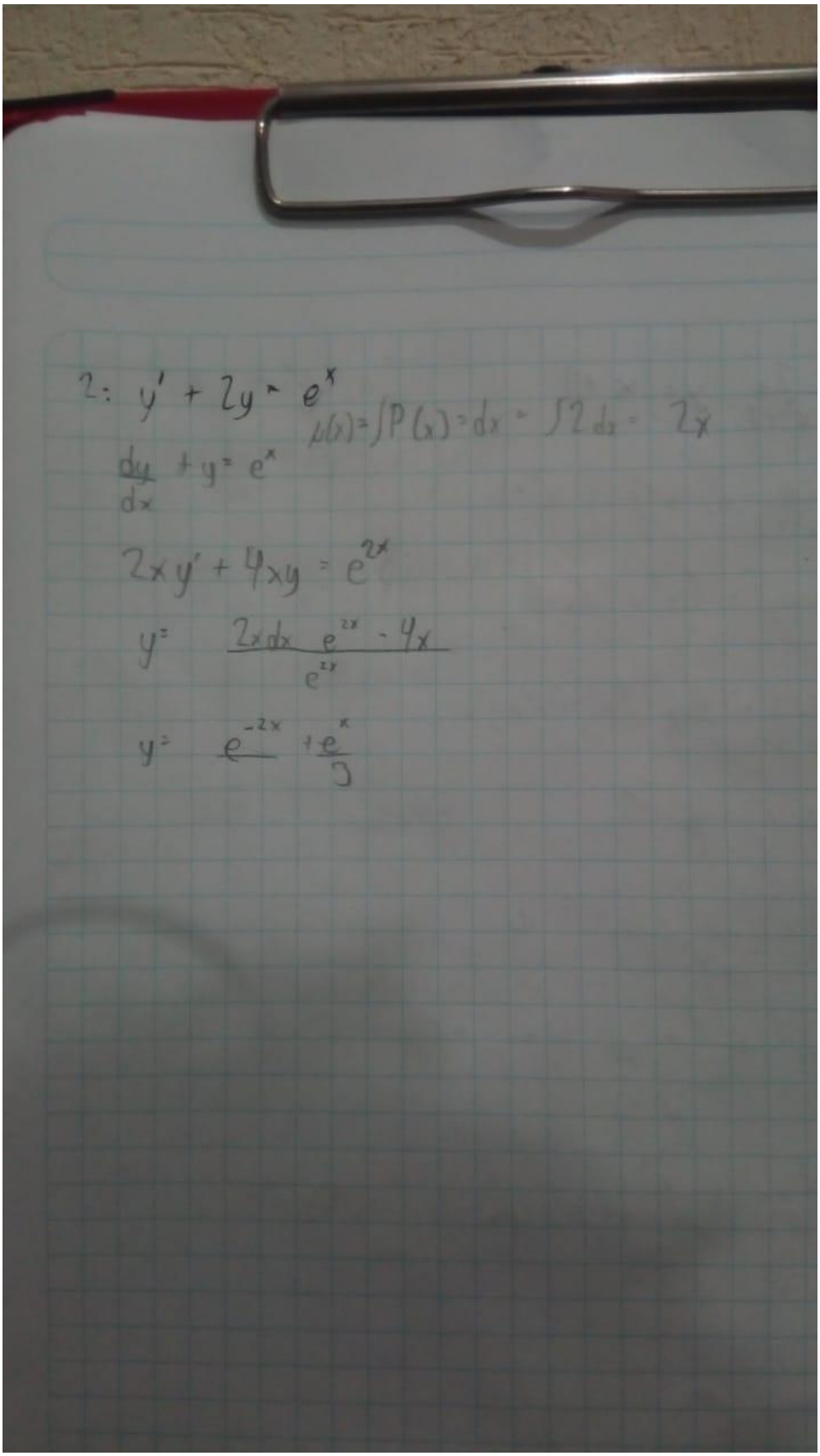
$(x^2+1)y' + \frac{d(x^2+1)}{dx} y = (x^2+1)(x+1)$

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

$\int y' dy = \int \frac{x^3 + x^2 + x + 1}{x^2+1} dx$

$y = \frac{\frac{x^4}{4} + \frac{x^3}{3} + \frac{x^2}{2} + x + C}{x^2+1}$

$y = \frac{x^4}{4(x^2+1)} + \frac{x^3}{3(x^2+1)} + \frac{x^2}{2(x^2+1)} + \frac{x}{x^2+1} + C$



2: $y' + 2y = e^x$

$\mu(x) = \int P(x)\,dx = \int 2\,dx = 2x$

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

$2xy' + 4xy = e^{2x}$

$y = \frac{2x\,dx\ e^{2x} \cdot 4x}{e^{2x}}$

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

3: $xy' + 2y = x^2$

$\left(x\frac{dy}{dx} + 2y = x^2\right)/x$

$\left(\frac{dy}{dx} + \frac{2y}{x} = x\right)\ \mu(x)\ \mu(x) = x^2$

$x^2\frac{dy}{dx} + 2yx = x^3$

$\int y\,dy = \int \frac{x^3 \cdot dx}{2\ x^2}$

$y = \frac{x^2}{4} + \frac{1}{x^2} + C$

4: $y' = y^5 \operatorname{sen}(x)$, $y(0) = 1/2$

$$\frac{dy}{dx} = y^5 \operatorname{sen}(x)$$

$$\int \frac{dy}{y^5} = \int \operatorname{sen}(x)\,dx$$

$$\frac{-1}{4y^4} = -\cos(x)$$

$$y = \frac{\sqrt[-4]{-\cos}}{\sqrt[-4]{4}}$$

$$y = \frac{1}{\sqrt[4]{\cos(x)}\ \sqrt[4]{-4}} + C$$