**OPRAVA:**

$C = \partial M$

$$\int_{\partial M} -y\,dx + x\,dy = \int_M (-1)\,dy \wedge dx + dx \wedge dy = 2\int_M dx\,dy$$

$$= 2\,\mathrm{vol}\,M$$

8.119

$y' = (2-y)\operatorname{tg}(x)$

$y' = g(y) f(x)$

$\int \frac{1}{g(y)} dy = \int f(x) dx$

$-\int \frac{dy}{y-2} = \int \frac{\sin x}{\cos x} dx$

$-\ln|y-2| = -\ln|\cos x| - \ln|C|$

$= -\ln|C \cos x|$

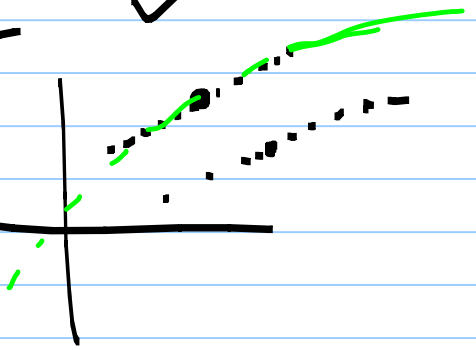
$|y-2| = |C \cos x|$

$y-2 = C \cos x \qquad C \in \mathbb{R}$

$C \neq 0$

$y \equiv 2$ ✓

$C \neq 0$



8.132 $f(t)$ ... počet lidí nakažených v čase $t$.

$$\frac{df}{dt} = k f(t)(P - f(t))$$

$$\int \frac{df}{f(P-f)} = \int k\, dt$$

$$\frac{1}{f(P-f)} = \frac{A}{f} + \frac{B}{P-f}$$

$$1 = A(P-f) + Bf$$

$$\Rightarrow A = \frac{1}{P}, \quad B = \frac{1}{P}$$

$$\frac{1}{P}\ln|f| - \frac{1}{P}\ln|P-f| = kt$$

$$\rightsquigarrow \boxed{f(t) = \frac{K}{1 + Le^{-Pkt}}}$$

8.134 $v$ .. rychlost $k$ .. konstanta úměrnosti

$$\frac{dv}{dt} = g - kv$$

$v_0 = v(0) = 5\ ms^{-1}$

$v(3) = ?$

$$v = \frac{g}{k} - \left(\frac{g}{k} - v_0\right) e^{-kt}$$

$$v' = +k\left(\frac{g}{k} - v_0\right) e^{-kt}$$

$$= g - k v_0 e^{-kt}$$

$$kv = g - (g - kv_0) e^{-kt}$$

$k = 0.5$

$$v(3) \doteq 20 - 15\, e^{-3/2}$$

8.141

$$y''' - 5y'' - 8y' + 48y = 0$$

$(e^{\lambda t})' = \lambda e^{\lambda t}$ $\quad$ $te^{\lambda t}$

$$\lambda^3 - 5\lambda^2 - 8\lambda + 48 = 0 \Rightarrow \lambda_1 = \lambda_2 = 4,\ \lambda_3 = -3$$

$$y = C_1 e^{4t} + C_2 t e^{4t} + C_3 e^{-3t}$$

$$y' = \sqrt{|y|}$$


$$y(t) = \frac{1}{4}(t+c)^2 \qquad y \neq 0$$