

MfNII Blatt 8 Musterlösung

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Pf. 8.1

$$y' = e^y \cdot \sin(x) \quad \text{mit } y = -\ln(C + \cos(x))$$
$$y' = \frac{-1}{C + \cos(x)} \cdot (-\sin(x)) = \frac{\sin(x)}{C + \cos(x)}$$
$$e^y \cdot \sin(x) = e^{-\ln(C + \cos(x))} \cdot \sin(x) = \frac{1}{C + \cos(x)} \cdot \sin(x) = y'$$

$\Rightarrow y(x) = -\ln(C + \cos(x))$ ist eine Lösungsschar

Pf. 8.2

a) $y\left(\frac{\pi}{2}\right) = 0$

$$y\left(\frac{\pi}{2}\right) = -\ln(C + \cos\left(\frac{\pi}{2}\right)) = 0$$
$$y\left(\frac{\pi}{2}\right) = -\ln(C + 0) = 0 \quad | e^\wedge$$
$$\frac{1}{C+0} = \frac{1}{C} = 1 \cdot C$$
$$\underline{C = 1}$$

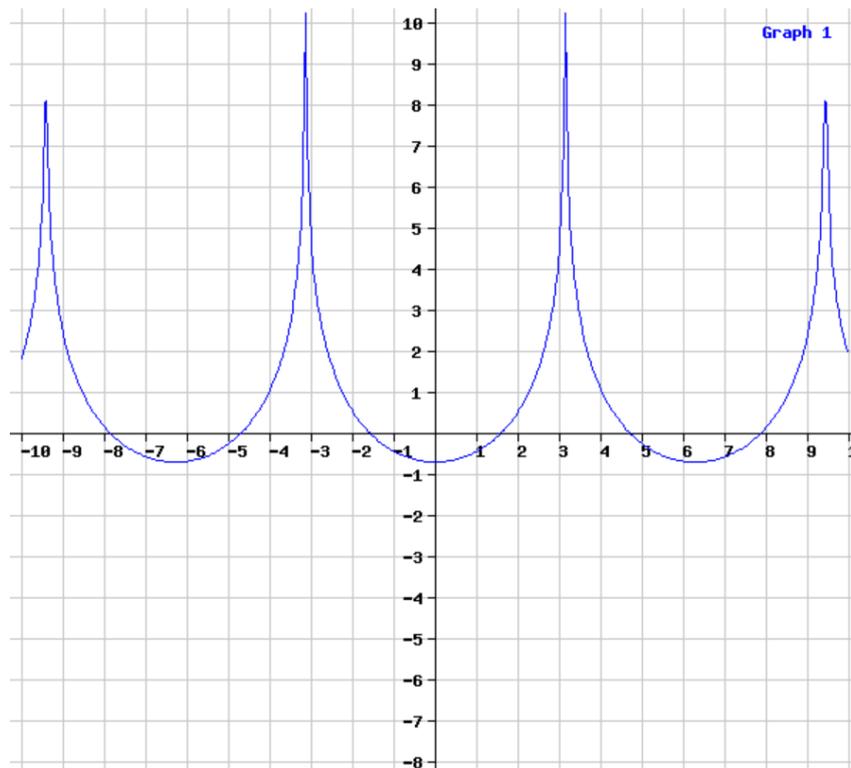
$\Rightarrow y(x) = -\ln(1 + \cos(x))$

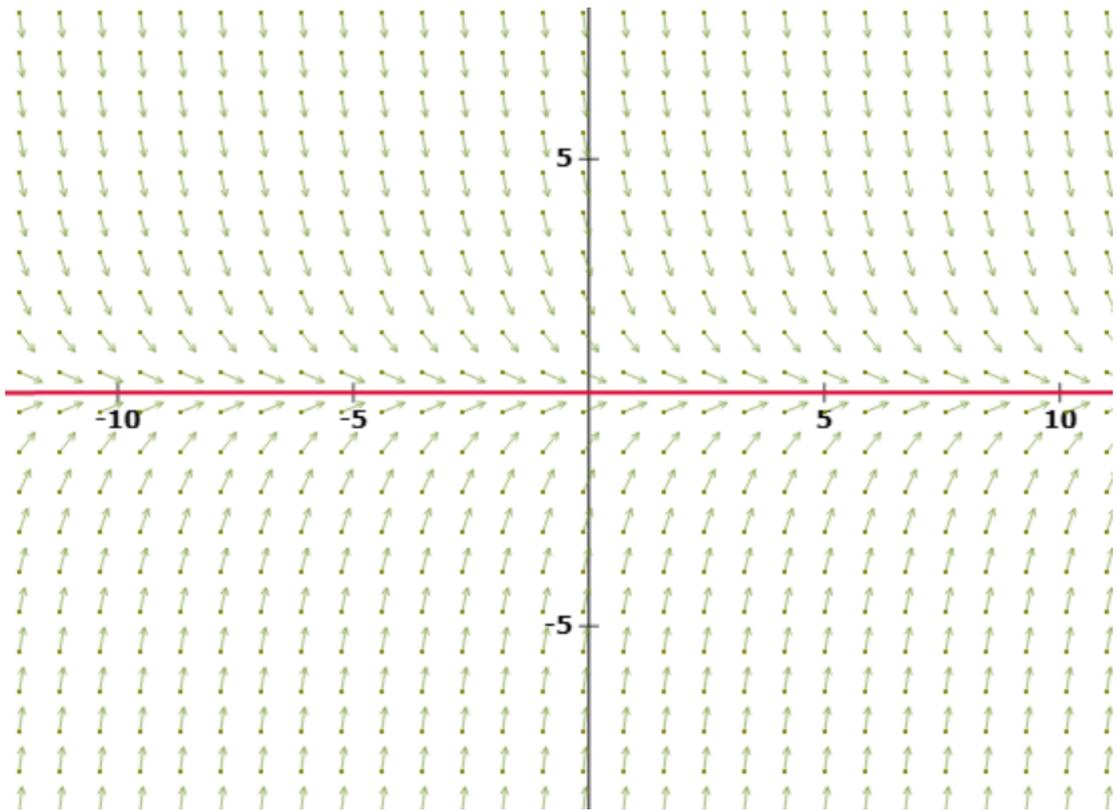
b) $y(\pi) = 0$

$$y(\pi) = -\ln(C + \cos(\pi)) = 0$$
$$y(\pi) = -\ln(C - 1) = 0 \quad | e^\wedge$$
$$\frac{1}{C-1} = 1 \quad | \cdot (C-1)$$
$$\underline{C = 2}$$

$\Rightarrow y(x) = -\ln(2 + \cos(x))$

Für 8.2 a):





b) $y'(x) = (x + y(x) - 1)^2$

Tabellarisch:

y \ x	-4	-3	-2	-1	0	1	2	3	4
-4	81	64	49	36	25	16	9	4	1
-3	64	49	36	25	16	9	4	1	0
-2	49	36	25	16	9	4	1	0	1
-1	36	25	16	9	4	1	0	1	4
0	25	16	9	4	1	0	1	4	9
1	16	9	4	1	0	1	4	9	16
2	9	4	1	0	1	4	9	16	25
3	4	1	0	1	4	9	16	25	36
4	1	0	1	4	9	16	25	36	49

