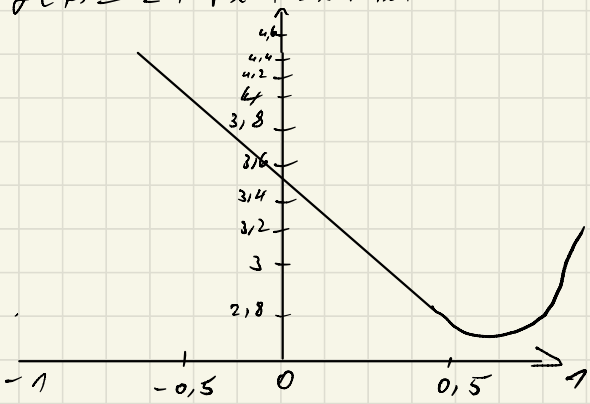
1) a) $y(x) = 2 - \sqrt{x^3 + 2x^2 + \_c1 - 4x + 4}$

$y(x) = 2 + \sqrt{x^3 + 2x^2 + \_c1 - 4x + 4}$

b) $y(x) = 2 \pm \sqrt{x^3 + 2x^2 - 4x + 2}$

c)



2) a)

b) $y(x) = \left(\left(-\frac{e^{2x}}{x} - 2\,Ei_1(-2x) \_c1 + \_c2 \right) x \right.$

c) $y(x) = \left(\frac{-\frac{e^{2x}}{x} - 2Ei_1(-2x)}{e^2} + \frac{2Ei_1(-2) + 3e^2}{e^2} \right) x.$

3) eq. points: $0, 1, -\frac{1}{2}$

- 0 → unstable
- 1 → locally asymptotically stable
- $-\frac{1}{2}$ → locally asymptotically stable

4) a) $x(t) = \_c_1 e^{\sqrt{5}t} + \_c_2 e^{-\sqrt{5}t}$

$y(t) = \_\_ c_1 \sqrt{5}\, e^{\sqrt{5}t} - \_ c_2 \sqrt{5}\, e^{-\sqrt{5}t} - 2\_ c_1 e^{\sqrt{5}t} - 2\_ c_2 e^{-\sqrt{5}t}$

h) $x(t) = \left(1 + \frac{4\sqrt{5}}{5}\right) e^{\sqrt{5}t} + \left(1 - \frac{4\sqrt{5}}{5}\right) e^{-\sqrt{5}t}$

$y(t) = \left(1 + \frac{4\sqrt{5}}{5}\right)\sqrt{5}\, e^{\sqrt{5}t} - \left(1 - \frac{4\sqrt{5}}{5}\right)\sqrt{5}\, e^{-\sqrt{5}t} - 2\left(1 + \frac{4\sqrt{5}}{5}\right) e^{\sqrt{5}t}$

$- 2\left(1 - \frac{4\sqrt{5}}{5}\right) e^{-\sqrt{5}t}$.