①

$x^2-2x+1=y$

$(x-1)^2=y$

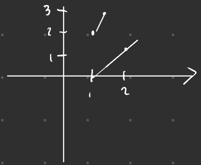
$x=\sqrt{y}+1$

$f(1)=1-2+1=0$ $\quad f:[-1,1]\to\mathbb{R}$

$f(2)=2^2-2\cdot 2+1=1$

$f^{-1}(\cancel{2}1)=2$

$f(2)=\sqrt{2}+1$



② $\ln 2=\sum_{n=0}^{\infty}\frac{(-1)^n}{n+1}$

$\frac{1}{1-x}=\sum_{n=0}^{\infty}x^n \Rightarrow \frac{1}{1+x}=\sum_{n=0}^{\infty}(-1)^n x^n \Rightarrow \ln(1+x)=\sum_{n=0}^{\infty}\frac{(-1)^n x^{n+1}}{n+1}$

ser at $x=1$ for at $\ln(1+x)=\ln 2$

$\ln 2=\sum_{n=0}^{\infty}\frac{(-1)^n\cdot \cancel{1^{n+1}}}{n+1}=\sum_{n=0}^{\infty}\frac{(-1)^n}{n+1}$

③ a) $\left[\begin{array}{ccc|c} 2 & 4 & 6 & 0\\ 3 & 5 & 7 & 0\\ 2 & 4 & 8 & 4\\ 1 & 1 & 1 & 0\end{array}\right]=$ $\quad \begin{array}{l} 3(2\,4\,6\,0)\\ -2(3\,5\,7\,0)\\ \hline 0\,2\,4\,0\end{array}$ $\quad \begin{array}{l} 2\,4\,6\,0\\ -(2\,4\,8\,4)\\ \hline 0\,0\,{-2}\,{-4}\end{array}$

$x_3=2$

$2x_2=-4x_3$

$x_2=-2x_3=-4$

$2x_1=-4x_2-6x_3$

$x=-2x_2-3x_3$

$x_1=8-6=2$

$\begin{cases} x=2\\ x_2=-4\\ x_3=2\end{cases}$

b) $\left[\begin{array}{ccc|c} 2 & 4 & 6 & 0\\ 3 & 5 & 7 & 0\\ 2 & 4 & 8 & 1\\ 1 & 1 & 1 & 1\end{array}\right]\Rightarrow$ $\quad \begin{array}{l} 3(2\,4\,6\,0)\\ -2(3\,5\,7\,0)\\ \hline 0\,2\,4\,0\end{array}$ $\quad \begin{array}{l} (2\,4\,6\,0)\\ -(2\,4\,8\,1)\\ \hline 0\,0\,{-2}\,{-1}\end{array}$

$x_3=\frac{1}{2}$

$x_2=-1$

$x_1=-2-\frac{3}{2}=-\frac{7}{2}$

$-\frac{7}{2}-1+\frac{1}{2}\neq 1$

$-4\neq 1$

ikke en løsning

④ $\int_0^1\frac{\cos x}{\sqrt{x}}\,dx\le\int_0^1\frac{1}{\sqrt{x}}\,dx=\Big[2\sqrt{x}\Big]_0^1=2\sqrt{1}-2\sqrt{0}=2$

⑤ $y'+y=\cos t$

$e^t y'+e^t y=e^t\cos t$

$\frac{d}{dt}e^t y=e^t\cos t$ integrer begge sider

$e^t y=\frac{1}{2}e^t(\cos t+\sin t)+C$

$y=\frac{1}{2}(\cos t+\sin t)+C\cdot e^{-t}$

$y(t)=\frac{1}{2}(\cos t+\sin t)+C\cdot e^{-t}$

$y(0)=\frac{1}{2}+C=2$

$C=\frac{3}{2}$

$y(t)=\frac{1}{2}(\sin t+\cos t)+\frac{3}{2}e^{-t}$

6 Def derivert

$$\lim_{h\to 0} \frac{(|x+h|)^2 - |x|}{h} = \text{setter inn } x=0 \Rightarrow \lim_{h\to 0} \frac{|h|}{h} \rightarrow \lim_{h\to 0^+} \frac{|h|}{h} = 1$$

$$\lim_{h\to 0^-} \frac{|h|}{h} = -1$$

noe som viser at den ikke er deriverbar i 0

7
```
import numpy as np
def f(x):
    return np.cos(x)

a=0
b= np.pi
n=16000
h=(b-a)/n
int=0
for i in range(n):
    x= a+ h·i
    int= x+ h·(np.sqrt(1+ f(x)**2))

print(int)
```

8 a) $A = \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$

$$0 = 1 \cdot \begin{vmatrix} 2-\lambda & 4 \\ 3 & 5-\lambda \end{vmatrix} = (10 - 2\lambda - 5\lambda + \lambda^2 - 12) = \lambda^2 - 7\lambda - 2$$

$$\lambda = \frac{7 \pm \sqrt{7^2 - 4 \cdot 1 \cdot (-2)}}{2} = \quad \left(\lambda - \frac{7-\sqrt{41}}{2}\right)\left(\lambda - 7 +\right.$$