1. $f: A \to \mathbb{R}$

$f(x) = x^2 - 2x + 1$

$f'(x) = 2x - 2$

$2x - 2 > 0$ for $[2, \to)$

tar $[2, 4]$

$f(2) = 1$

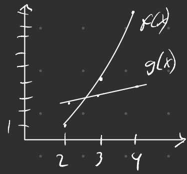
$f(3) = 4$

$f(4) = 9$

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

$g(3) = \sqrt{3} + 1$

$g(4) = 3$




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

$(x-1)^2 = y$

$x - 1 = \sqrt{y}$

$x = \sqrt{y} + 1 \Rightarrow g(x) = \sqrt{x} + 1$

$x = 1$

2. $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$

$\ln(x+1) = \frac{1}{x+1}$

$\int_0^x \sum_{n=0}^{\infty} (-x)^n = \int_0^x \frac{1}{1+x}$

$\ln|1+x| - \ln|1+0| = \sum_{n=0}^{\infty} (-1)^n \int_0^x (a)^n$

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

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

setter inn $x = 1$

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

3. Gjort ~~for~~

4. Gjort for

5. $\dot{y} + y = \cos t$

$e^t (\dot{y} + y) = e^t \cos t$

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

$e^t y = \int e^t \cos t$

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

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

$y(0) = \frac{1}{2} \cdot 1 + C = 2 \quad \Rightarrow C = \frac{3}{2}$

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

7. $s = \int_0^{\pi} \sqrt{1 + f'(x)^2}$

$f'(x) = \cos x$

```
import numpy as np
def func(x):
    return np.sqrt( 1+(np.cos(x))**2)

a=0
b= np.pi
n= 10000
h=(b-a)/n
summen=0
for i in range(n):
    x= a+ hi
    summen+= h.(func(x))
```

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

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

$$\lambda = \frac{7 \pm \sqrt{7^2 - 4 \cdot 1 \cdot (-2)}}{2} = \frac{7 \pm \sqrt{57}}{2}$$

$$\lambda = \frac{7 + \sqrt{57}}{2} \qquad \begin{bmatrix} -8 \\ 11 + \sqrt{41} \end{bmatrix}$$

$$\lambda = \frac{7 - \sqrt{57}}{2} \qquad \begin{bmatrix} 17 - \sqrt{41} \\ -6 \end{bmatrix}$$