midtveis oppgave 6

$$\frac{\ln\left(e^{\frac{\pi+\pi^2}{\pi}-1}\right)}{\pi} = \frac{\frac{\pi+\pi^2}{\pi}-1}{\pi} = \frac{\frac{\pi+\pi^2-\pi}{\pi}}{\pi}$$

$$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{ad}{bc} \qquad = \frac{\frac{\pi^2}{\pi}}{\pi} = \frac{\pi^2}{\pi^2} = 1$$

10. $f(x) = cx + \sin\frac{x}{c}$ $\quad f'(x) = c + \frac{1}{c}\cos\frac{x}{c}$ $\quad f''(x) = -\frac{1}{c^2}\sin\frac{x}{c}$ $\quad f'''(x) = -\frac{1}{c^3}\cos\frac{x}{c}$

$f(0) = 0$ $\quad f'(0) = c + \frac{1}{c}$ $\quad f''(0) = 0$ $\quad f'''(0) = -\frac{1}{c^3}$

$P_3(x) = (c + \frac{1}{c})x - \frac{1}{c^3 6}x^3$ $\Rightarrow$ $c + \frac{1}{c} = -2$ ← passer !

Mais $P_3(x) = -2x + \frac{x^3}{6}$ $\quad -\frac{1}{6c^3} = \frac{1}{6} \Rightarrow c = -1$

Oppgave 11: $1021_\beta = \beta^3 + 2\beta + 1 = 136$

test alle verdier for $\beta$ fra oppgaven.

Oppgave 12 $f(x) = \cos x$ $R_n(x) = \frac{f^{(n+1)}(c)}{(n+1)!} x^{n+1}$

$\pm \sin(c)$ eller $\pm \cos c$

$\Rightarrow |f^{(n+1)}(c)| \leq 1$

$\Rightarrow |R_n(x)| \leq \frac{x^{n+1}}{(n+1)!} \leq \frac{1}{(n+1)!} \leq 0{,}001 = 10^{-3}$

$(n+1)! \geq 10^3 = 1000$

$n+1 \geq 7 \Rightarrow \underline{\underline{n \geq 6}}$

$6! = 720$

$7! = 5040$

Oppgave 17

$$X_{n+1} - 6X_n = 1 \qquad X_1 = -\frac{1}{5}$$

$X_n^h$: $A \cdot 6^n$

$X_n^p = A \Rightarrow A - 6A = 1 \Leftrightarrow -5A = 1 \Leftrightarrow A = -\frac{1}{5}$

$\Rightarrow$ generell løsning: $X_n = A \cdot 6^n - \frac{1}{5}$

løsning her: $X_n = -\frac{1}{5}$ $(A = 0)$

maskinenen blir rundt av i initialbetingelsen, og finner løsning $\varepsilon \cdot 6^n - \frac{1}{5} \longrightarrow \infty$