Martin Skatvedt - Øving 8 - MA0001

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5.2.7

a) $2,89 = 4,3^x$

$\ln 2,89 = x \ln 4,3$

$x = \frac{\ln 2,89}{\ln 4,3} \approx \frac{1,0612}{1,4586} \approx \underline{0,73}$

b) $0,08 = 0,3^N$

$\ln 0,08 = N \ln 0,3$

$N = \frac{\ln 0,08}{\ln 0,3} \approx \frac{-2,5257}{-1,2039} \approx \underline{2,1}$

5.3.4

$12\% \rightarrow \left(1 + \frac{12}{100}\right) = \underline{1,12}$

$f(x) = 1,12^x$

a) $f(10) = 1,12^{10} = \underline{3,1058}$

$y = (3,1058 - 1) \cdot 100 = 210,58\% \approx \underline{211\%}$

b) $f\left(\frac{1}{12}\right) = 1,12^{\frac{1}{12}} \approx \underline{1,0094}$

$y = (1,0094 - 1) \cdot 100 = 0,9488\% \approx \underline{0,95\%}$

c) $f\left(\frac{1}{365}\right) = 1,12^{\frac{1}{365}} \approx \underline{1,0003}$

$y = (0,0003 - 1) \cdot 100 = 0,0310\% \approx \underline{0,03\%}$

5.B.11

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$43\% \rightarrow \left(1 + \frac{43\%}{100}\right) = \underline{1,43}$

$B(t) = 1000 \cdot 1,43^{\frac{t}{0,128}}$

$B(780) = 1000 \cdot 1,43^{\frac{780}{17}} = 1000 \cdot 13\,402\,405,36$

$= \underline{13\,402\,405\,362} \approx \underline{1,3 \cdot 10^{10} \text{ bakterier}}$

5.B.30

a) $15\% \rightarrow \left(1 + \frac{15}{100}\right) = \underline{1,15}$

$\underline{V(t) = 1000 \cdot 1,15^t}$

$V(0) = 1000$

$V(1) = V(0) \cdot 1,15 \rightarrow 1,15 \cdot 1000$

$V(2) = V(1) \cdot 1,15 \rightarrow 1,15^2 \cdot 1000$

$\vdots$

$V(n) = V(n-1) \cdot 1,15 \rightarrow 1,15^n \cdot 1000$

b) $V(t) = 2000$

$1000 \cdot 1,15^t = 2000 = 1,15^t = 2$

$= t \ln 1,15 = \ln 2 = t = \frac{\ln 2}{\ln 1,15}$

$= \frac{0,6931}{0,1397} = \underline{4,96 \text{ timer}}$

Vannmengden er fordoblet etter 4,96 timer

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$25^{-2x} = 125^{x+7}$

$-2x \cdot \ln 25 = (x+7) \cdot \ln 125$

$2x = -(x+7) \cdot \frac{\ln 125}{\ln 25}$

$-2x = (x+7) \cdot 1,5$

$-2x = 1,5x + 10,5$

$3,5x = -10,5$

$x = -\frac{10,5}{3,5} = \underline{\underline{-3}}$

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$I_0 = \frac{k_{14}}{k_{12}}$

halveringstid = 5730

I = 75% av I_0

$I(t) = I_0 \cdot 0,5^{\frac{t}{5730}}$

$0,5^{\frac{t}{5730}} = \frac{1}{I_0} = 0,75$

$\frac{t}{5730} \ln 0,5 = \ln 0,75$

$\frac{t}{5730} = \frac{\ln 0,75}{\ln 0,5} = 0,4150$

$t = 5730 \cdot 0,4150 = \underline{2378,16 \text{ år}}$

$2022 - 2378 = \underline{-356}$

Påstanden er ikke sann da nedskrivingen er fra 356 f.v.t