ARK 6

g) planet α: $\frac{x}{3} + \frac{y}{4} + \frac{z}{t} = 1$

når $t \to \infty$, vil $\frac{z}{t} = 0$

planet α: $\frac{x}{3} + \frac{y}{4} = 1 \quad | \cdot 12$

$4x + 3y = 12$ plan parallelt med z-aksen fordi $\vec{n} = [4,3,0]$

Dette planet skjærer xy planet langs linja $4x + 3y = 12$

$3y = -4x + 12$

$y = -\frac{4}{3}x + 4$

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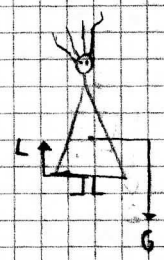
④ a) $F = ma$ hvor $F = G - L$



$G - L = mv'(t)$

$mg - k_1 v(t) = mv'(t) \quad | : m$

$g - \frac{k_1}{m} v(t) = v'(t)$

$\underline{\underline{v'(t) + \frac{k_1}{m} v(t) = g}}$

b) $m = 80\,kg \quad g = 10 \quad k_1 = 16$

$v'(t) + \frac{16}{80} v(t) = 10$

$e^{\int 0{,}2\,dt} = e^{0{,}2t}$

$v'(t) + 0{,}2v(t) = 10 \quad | \cdot e^{0{,}2t}$

$v'(t) \cdot e^{0{,}2t} + v(t) \cdot 0{,}2e^{0{,}2t} = 10e^{0{,}2t}$

$[v(t) \cdot e^{0{,}2t}]' = 10e^{0{,}2t}$ / integrerer

$v(t) \cdot e^{0{,}2t} = \int 10\, e^{0{,}2t}\, dt$

$v(t) \cdot e^{0{,}2t} = 10 \cdot \frac{1}{0{,}2} e^{0{,}2t} + C \quad / : e^{0{,}2t}$

$v(t) = 50 + \frac{C}{e^{0{,}2t}}$

Setter inn $(0,0)$ siden $v(0) = 0$

$0 = 50 + \frac{C}{e^{0,2 \cdot 0}}$

$0 = 50 + \frac{C}{1}$

$C = -50$

$\underline{\underline{v(t) = 50 - 50e^{-0{,}2t}}}$

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c) $v(4) = 50 - 50e^{-0{,}2 \cdot 4} = 27{,}5$ Farten er 27,5 m/s

$v' + 0{,}2v = 10$ kan brukes for å finne akselerasjonen $= v'$

$v' + 0{,}2 \cdot 27{,}5 = 10$

$v' = 10 - 0{,}2 \cdot 27{,}5$

$v' = 4{,}5$

akselerasjonen er $4{,}5\,m/s^2$

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d) $ma = F$ blir nå

$mv' = mg - k_2 v^2$

$80v' = 80 \cdot 10 - 8v^2 \quad | : 80$

$v' = 10 - 0{,}1v^2 \quad | : (10 - 0{,}1v^2)$

$\frac{1}{(10 - 0{,}1v^2)} \cdot v' = 1$

$\frac{1}{10 - 0{,}1v^2} \frac{dv}{dt} = 1$

$\int \frac{10}{10(10 - 0{,}1v^2)}\, dv = \int 1\, dt$

$\int \frac{10}{100 - v^2}\, dv = \int 1\, dt$

Del brøkoppspalting:

$\frac{10}{100 - v^2} = \frac{A}{(10 - v)} + \frac{B}{(10 + v)} \quad | \cdot (10 - v)(10 + v)$ antar $v > 10$