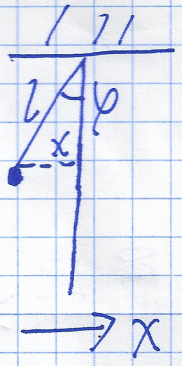
5.



$-ma_0 = +m(g+a)\sin\varphi$

$a_0 = -(g+a)\sin\varphi$

$\sin\varphi = \frac{x}{l}$

$a_0 + \frac{g+a}{l}x = 0$

$a = \ddot{x} = -\omega^2 x$

$\omega = \sqrt{\frac{g+a}{l}}$

$T = 2\pi\sqrt{\frac{l}{g+a}}$

$= 2\pi\sqrt{\frac{1}{9.8+2.2}}$

$\approx 1.8\,s$

6. $A = A_0 e^{-\beta t}$

$\frac{A_0}{A_1} = \frac{A_0}{A_0 e^{\beta t_1}} = e^{\beta t_1} = 2$

$\beta t_1 = \ln 2$

$\beta = \frac{\ln 2}{5}$

$\beta t_2 = \ln 8$

$t_2 = \frac{\ln 8}{\beta}$

$= \ln 8 \times \frac{5}{\ln 2}$

$= 15\,s$