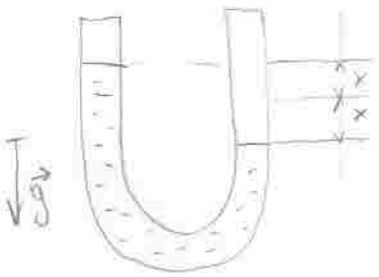
10.41/

Dane:
$S\,[m^2]$
$\rho\,[kg/m^3]$
$m\,[kg]$



$$F = -\rho \cdot S \cdot 2x \cdot g \quad \{k = 2 \cdot \rho \cdot S \cdot g\}$$

$$a = \frac{F}{m}$$

$$a = -\frac{2 \cdot S \cdot \rho \cdot g}{m} \cdot x \quad \left\{\frac{k}{m} = \omega^2\right\}$$

$$\omega = \frac{2\pi}{T}$$

$$\omega^2 = \frac{4\pi^2}{T^2}$$

$$T^2 = 4\pi^2 \cdot \frac{m}{2 \cdot S \cdot \rho \cdot g}$$

$$\boxed{T = 2\pi \cdot \sqrt{\frac{m}{2 \cdot S \cdot \rho \cdot g}}}$$

Ruch harmoniczny siła jest proporcjonalna do wychylenia.

$$F = -k \cdot x$$

$$m \cdot \frac{d^2x}{dt^2} = -k \cdot x$$

$$m \frac{d^2x}{dt^2} + k \cdot x = 0$$

$$m \cdot \frac{d^2x}{dt^2} + kx = 0$$

$$\frac{d^2x}{dt^2} + \frac{k}{m} x = 0 \quad \left\{\frac{k}{m} = \omega^2\right.$$

$$\frac{d^2x}{dt^2} + \omega^2 \cdot x = 0$$

$$t^2 + \omega^2 = 0$$

$$\{t_1 = i\omega \quad t_2 = -i\omega\}$$

$$x(t) = A \cdot e^{i\omega t} + B \cdot e^{-i\omega t}$$

$$\frac{dy}{dx} - a_0 y = 0$$

$$\frac{dy}{dx} = a_0 \cdot y \quad \{\log_a b = c,\ a^c = b\}$$

$$\frac{dy}{dx} = a_0 \cdot y$$

$$\int \frac{dy}{y} = \int a_0 \cdot dx$$

$$\ln y + C_1 = a_0 \cdot x + C_2 \quad \{C_2 - C_1 = C\}$$

$$\ln y = a_0 \cdot x + C$$

$$y = e^{a_0 \cdot x + C}$$

$$y = e^{a_0 \cdot x} \cdot e^C \quad \{e^C = b\}$$

$$\boxed{y = C \cdot e^{a_0 \cdot x}}$$