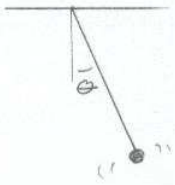
$$\frac{d^2\theta}{dt^2} = -\omega^2\theta$$



describes a SHO

because the equation of motion has the solution

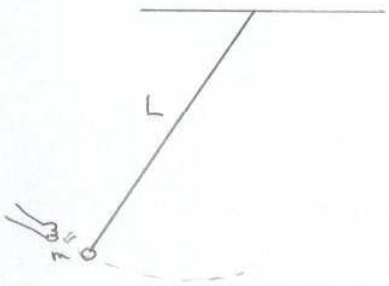
$$\theta(t) = \theta_m \cos(\omega t + \phi) \quad \text{where} \quad \omega = \sqrt{\frac{g}{L}}$$

so $T = \frac{2\pi}{\omega}$ $\qquad T = 2\pi\sqrt{\frac{L}{g}}$ know this!

* SIMPLE PENDULUM

$f = \frac{1}{2\pi}\sqrt{\frac{g}{L}}$ * f is independent of the AMPLITUDE θ; a property of a SHO!

We can now use this expression to find g_{room}.



$$T = 2\pi\sqrt{\frac{L}{g}}$$

$$T^2 = 4\pi^2\frac{L}{g} \qquad \text{so} \qquad g = \frac{4\pi^2 L}{T^2}$$