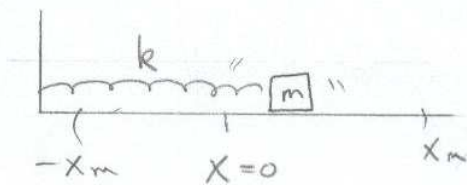


Recall our SHO of a Mass/spring SYSTEM

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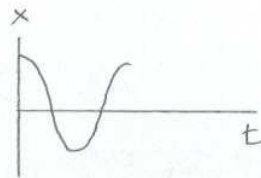
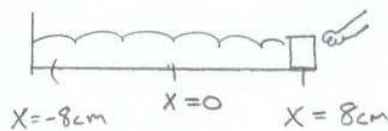
EQ of Motion: $\frac{d^2x}{dt^2} = -\omega^2 x$

where $\omega = \sqrt{\frac{k}{m}}$

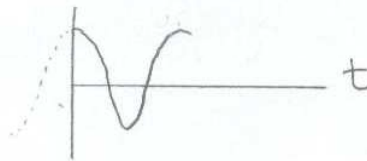
and $x(t) = X_m \cos(\omega t + \phi)$ [SHM]

↑ Harmonic simple (only 1 frequency)

What if the mass were released from $X = 8\text{cm}$ at $t = 0$.



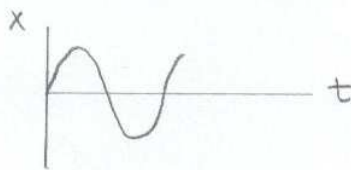
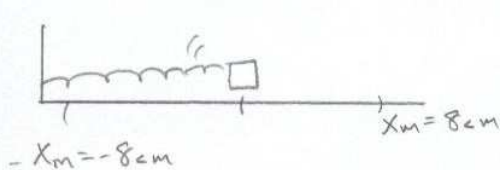
$x(t) = 8\text{cm} \cos \omega t$



OR $x(t) = 8\text{cm} \sin(\omega t + \phi)$

what is ϕ ?

What if the SYSTEM was already oscillating & we started our watch when the mass passed through $X=0$ toward X_m .



$x(t) = 8\text{cm} \sin \omega t$

OR $x(t) = 8\text{cm} \cos(\omega t + \phi)$

$\phi = ?$