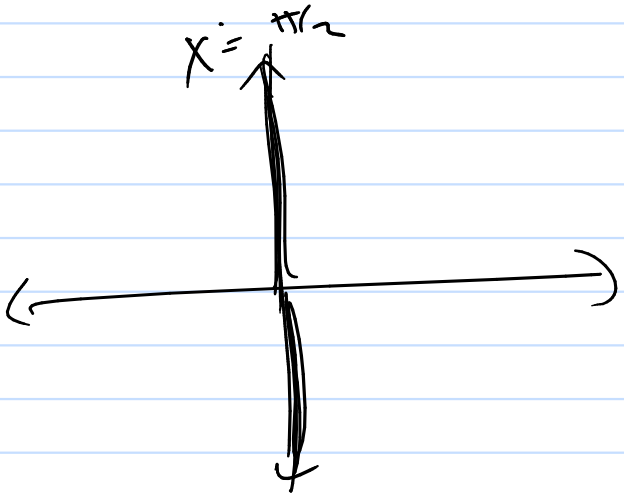
Math 112

Q's

4 $2\cos(x)\sin(x) - \cos(x) = 0$

$\cos(x)(2\sin x - 1) = 0$

$\cos x = 0$

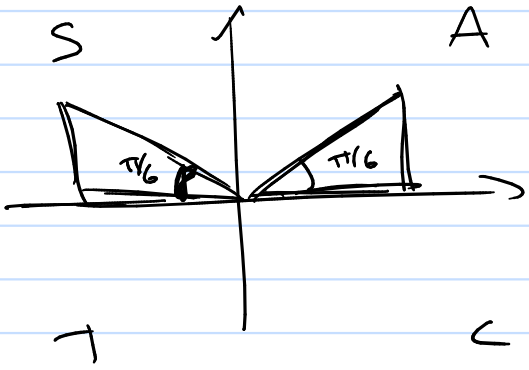


$x = \pi/2 + 2n\pi$

$x = 3\pi/2 + 2n\pi$

$2\sin x - 1 = 0$

$\sin x = 1/2$



$x = \pi/6 + 2n\pi$

$x = \frac{5\pi}{6} + 2n\pi$

$\cos(2\theta)$

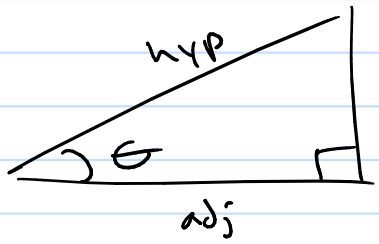
$\cos(4\theta) = \cos(2\theta + 2\theta)$ use sum formula

$\cos(4\theta) = \cos(2(2\theta))$ or use double angle formula

Ch 10 Trig

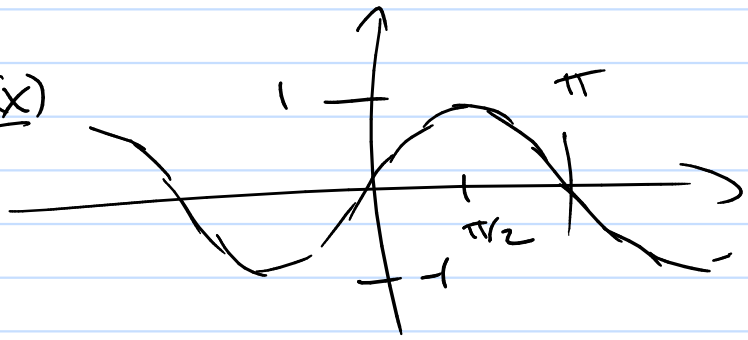
① angles (radians / degrees)

② trig functions (ex) $\sin\theta = \frac{opp}{hyp}$ etc



③ Lots and Lots & Identities

④ ~~Graphs~~ $f(x) = \sin(x)$



Applications?

$$f(x) = A\sin(\omega x + \phi) + B$$

① $|A|$ amplitude

② ω angular frequency | ordinary frequency $f = \frac{1}{T}$

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

③ period $\boxed{T} = \frac{2\pi}{\omega}$

this is usually measured in applications

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

Application of a function

⇒ "do you see things that do..." ⇒ 5^x

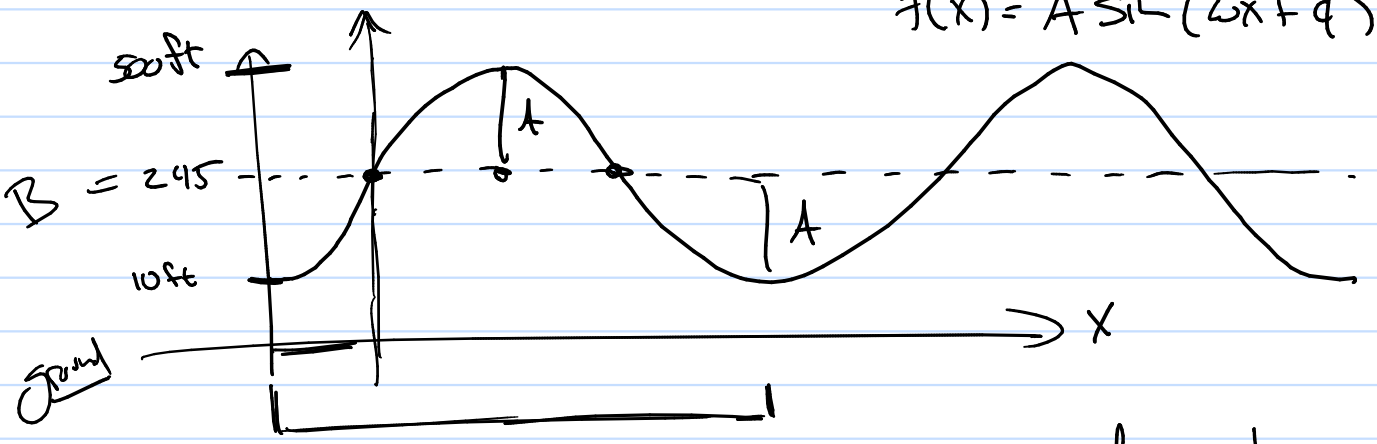
④ phase ϕ, phase shift $\frac{-\phi}{\omega}$

⑤ vertical shift B

Applications of periodic motion

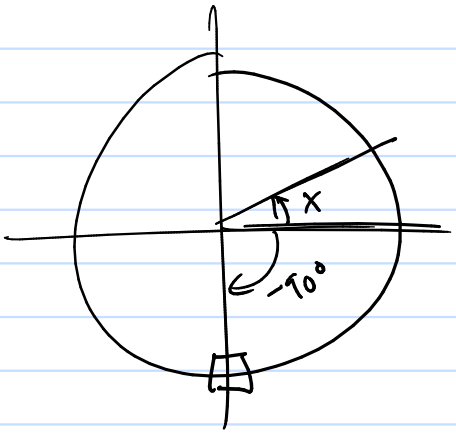
Q: Do you observe periodic motion?

$$f(x) = A\sin(\omega x + \phi) + B$$

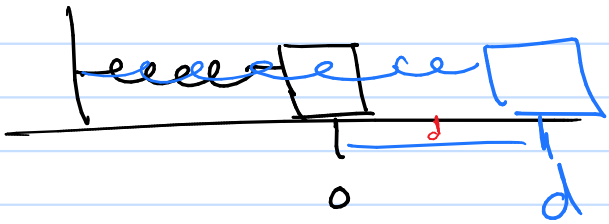


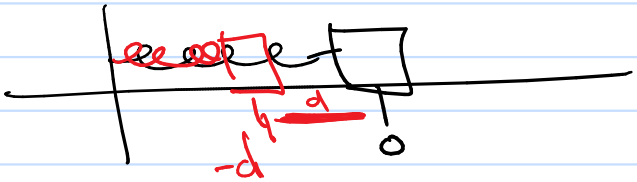
$T = 5\text{ min}$ $\quad t = 5\text{ min}$ $\quad f = \frac{1}{5}$

$$\omega = \frac{2\pi}{5}$$



Example





Force $\propto d$

directly proportional

Springs $F = kd$

spring constant

$x(t) = A\sin(\omega t + \phi)$ ✓

↑ position of mass on the spring

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

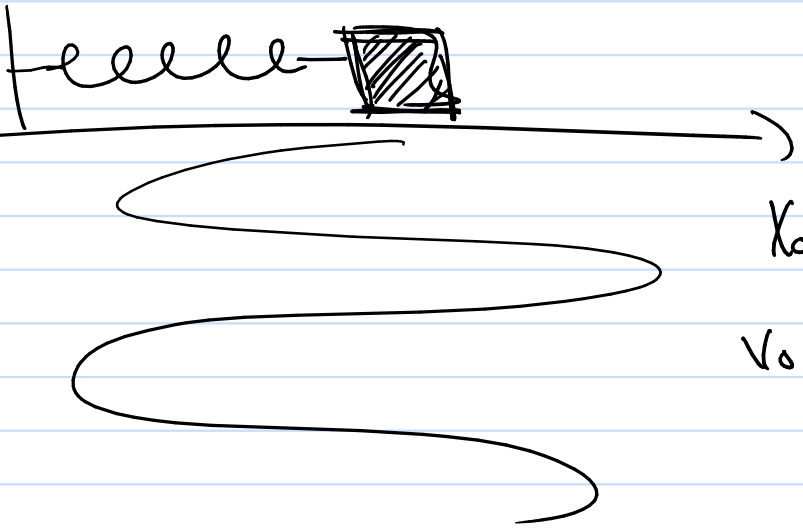
$A = \sqrt{x_0^2 + \left(\frac{v_0}{\omega}\right)^2}$

$x_0 \equiv$ initial position @ $t=0$

$v_0 \equiv$ initial velocity @ $t=0$

M = mass

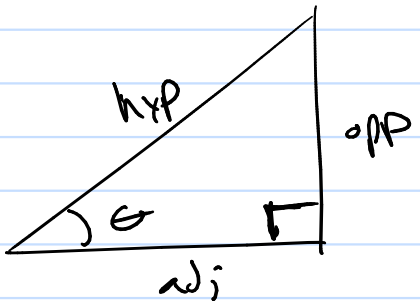
k = spring constant



$x_0 = A\sin(\phi)$

$v_0 = A\omega\cos(\phi)$

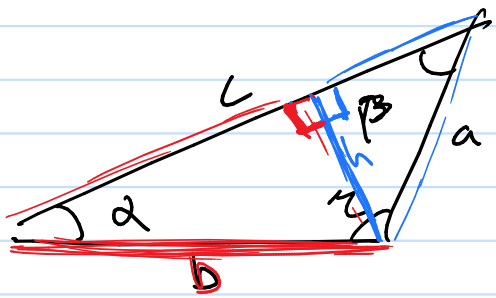
11.2 So far --

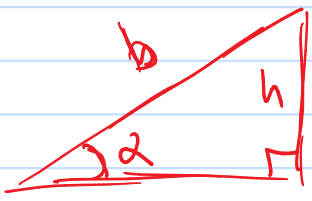


$\sin(\theta) = \frac{opp}{hyp}$

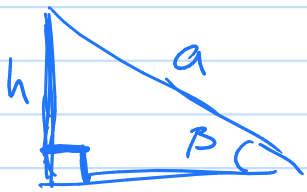
$\cos(\theta) = \frac{adj}{hyp}$

ch 2





$\sin\alpha = \frac{h}{b}$



$\sin\beta = \frac{h}{a}$

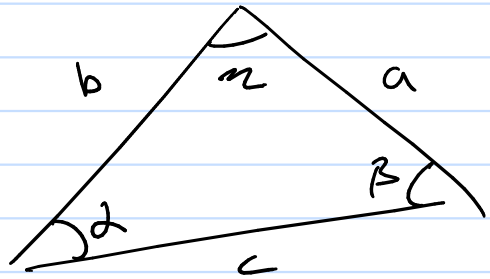
$b\sin\alpha = a\sin\beta$

$b\sin\alpha = h$

$h = a\sin\beta$

$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b}$

So



Law of Sines

$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

or

$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma}$$