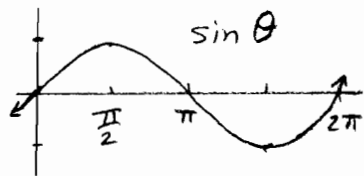


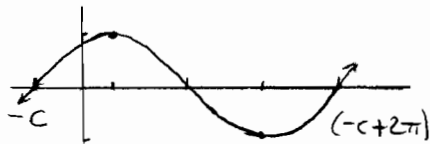
sinusoidal functions

$\sin \theta$



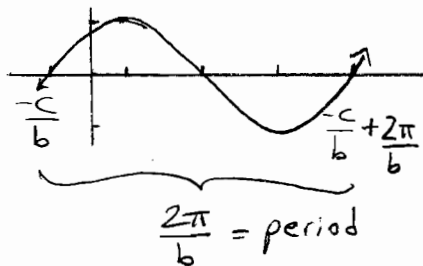
(shift by $-c$)

$\sin(\theta+c)$



(stretch by $\frac{1}{b}$)

$\sin(b\theta+c)$

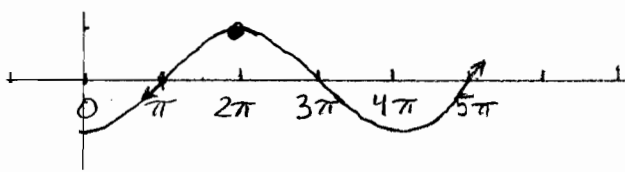


example: $\sin(\frac{1}{2}\theta + (-\frac{\pi}{2}))$.

Here $b = \frac{1}{2}$, $c = -\frac{\pi}{2}$.

So $(\frac{-c}{b}) = \pi$,

and period = $\frac{2\pi}{(\frac{1}{2})} = 4\pi$



To find key points (quarter cycle points), set the argument of the sine function equal to $n\frac{\pi}{2}$ and solve for x :

Set $\frac{1}{2}\theta + (-\frac{\pi}{2}) = n\frac{\pi}{2}$

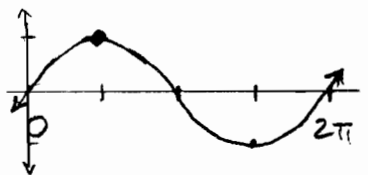
So $\frac{1}{2}\theta = n\frac{\pi}{2} + \frac{\pi}{2}$

So $\theta = n\pi + \pi = (n+1)\pi$

n	0	1	2	3	4
x	π	2π	3π	4π	5π

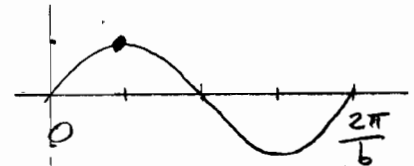
Zeros when n is even, turning points when n is odd.

$\sin \theta$



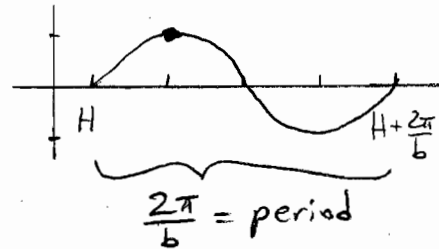
(stretch by $\frac{1}{b}$)

$\sin(b\theta)$



(shift by H)

$\sin(b(\theta-H))$



example: $\sin(\frac{1}{2}(\theta - \pi))$

Here $b = \frac{1}{2}$,

$H = \pi$,

and period = $\frac{2\pi}{(\frac{1}{2})} = 4\pi$

(same example, same graph.)

