

Key

Hour: _____ Date: _____

Graphing Sine Functions (One Cycle) Notes

Properties of the Sine Function:

- Equation: $y = a \sin b\theta$ where $a \neq 0$ and $b > 0$
 θ is in radians!
- $|a|$ = amplitude - gives max/min
- b = number of cycles between 0 and 2π
- Period: $\frac{2\pi}{b}$

Steps to Graph the Sine Function:

- Find amplitude and period
- make a table, breaking the period into 4 parts $\rightarrow$ use 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1
- Sketch graph

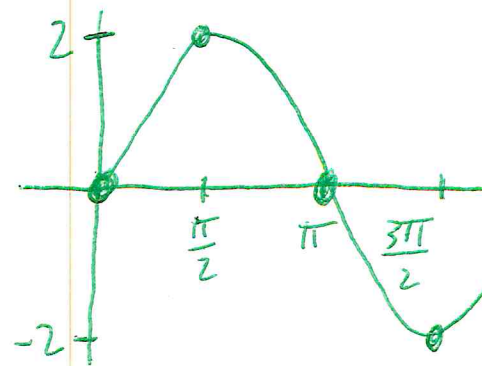
1) $y = 2\sin\theta$

$a = 2$

$b = 1$

Period = $\frac{2\pi}{b} = \frac{2\pi}{1} = 2\pi$

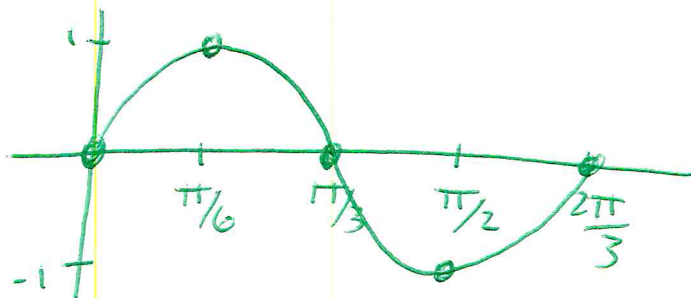
θ	y
$0(2\pi) = 0$	0
$\frac{1}{4}(2\pi) = \frac{\pi}{2}$	max (2)
$\frac{1}{2}(2\pi) = \pi$	0
$\frac{3}{4}(2\pi) = \frac{3\pi}{2}$	min (-2)



2) $y = \sin(3\theta)$

$a=1$ $b=3$ Period = $\frac{2\pi}{3}$

θ	y
$0(\frac{2\pi}{3}) = 0$	0
$\frac{1}{4}(\frac{2\pi}{3}) = \frac{2\pi}{12} = \frac{\pi}{6}$	max (1)
$\frac{1}{2}(\frac{2\pi}{3}) = \frac{2\pi}{6} = \frac{\pi}{3}$	0
$\frac{3}{4}(\frac{2\pi}{3}) = \frac{6\pi}{12} = \frac{\pi}{2}$	min (-1)
$1(\frac{2\pi}{3}) = \frac{2\pi}{3}$	0



3) $y = -2\sin(\pi\theta)$

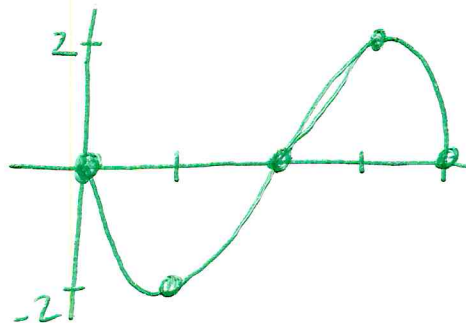
$a=-2$ (decreases!)

$b=\pi$

Period:

$\frac{2\pi}{b} = \frac{2\pi}{\pi} = 2$

θ	y
$0(2) = 0$	0
$\frac{1}{4}(2) = \frac{2}{4} = \frac{1}{2}$	min (-2)
$\frac{1}{2}(2) = \frac{2}{2} = 1$	0
$\frac{3}{4}(2) = \frac{6}{4} = \frac{3}{2}$	max (2)
$1(2) = 2$	0



4) $y = -4\sin(\frac{\theta}{2})$

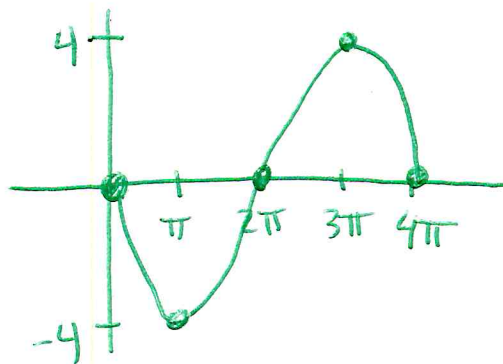
$a=-4$ (decreases)

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

Period:

$\frac{2\pi}{b} = \frac{2\pi}{\frac{1}{2}} = 4\pi$

θ	y
$0(4\pi) = 0$	0
$\frac{1}{4}(4\pi) = \frac{4\pi}{4} = \pi$	min (-4)
$\frac{1}{2}(4\pi) = \frac{4\pi}{2} = 2\pi$	0
$\frac{3}{4}(4\pi) = \frac{12\pi}{4} = 3\pi$	max (4)
$1(4\pi) = 4\pi$	0



5) $y = 2\sin(\frac{\pi}{2}\theta)$

$a=2$

$b=\frac{\pi}{2}$

Period:

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

θ	y
$0(4) = 0$	0
$\frac{1}{4}(4) = 1$	max (2)
$\frac{1}{2}(4) = 2$	0
$\frac{3}{4}(4) = 3$	min (-2)
$1(4) = 4$	0

