Note Title 11/4/2010

Period

Example

a) $y = \frac{2}{3}\sin 4x$.

$B = 4$.

period $p = \frac{2\pi}{B}$

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

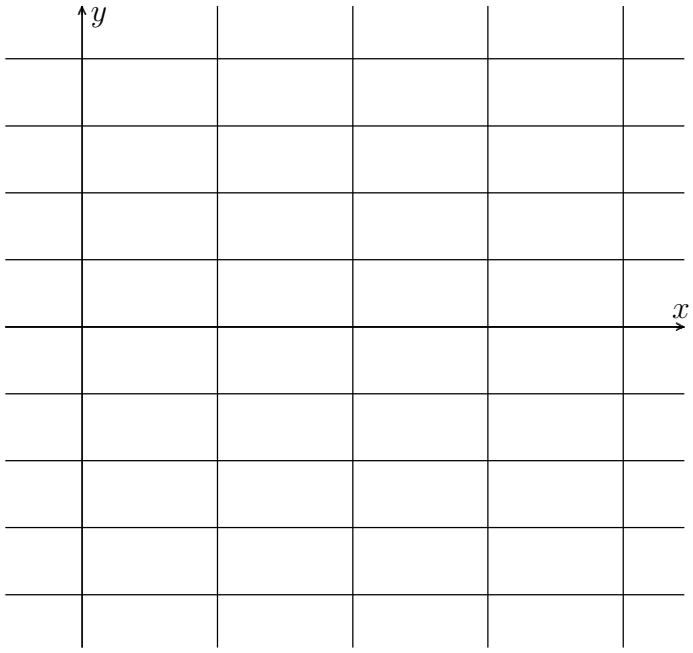
b) $y = -\cos 7x$.

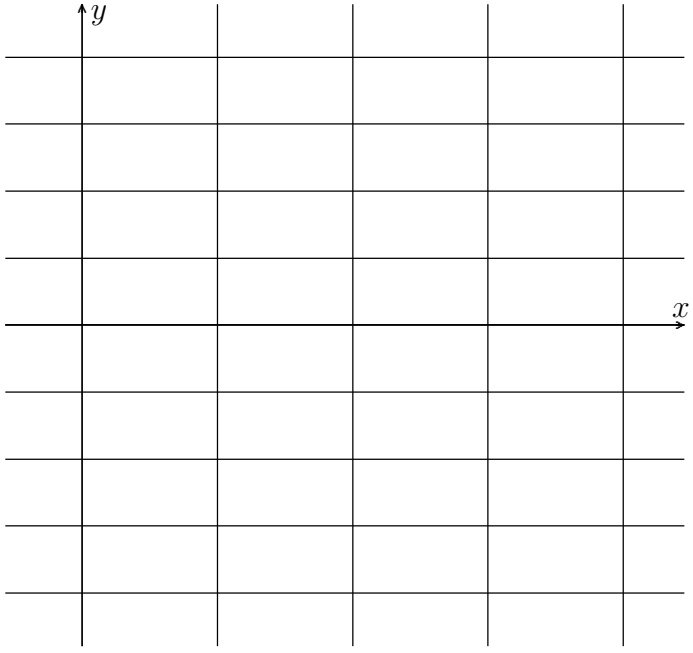
period $p = \frac{2\pi}{7}$

c) $y = 4\cos\left(\frac{\pi}{4}x\right)$

period $p = \frac{2\pi}{\pi/4}$

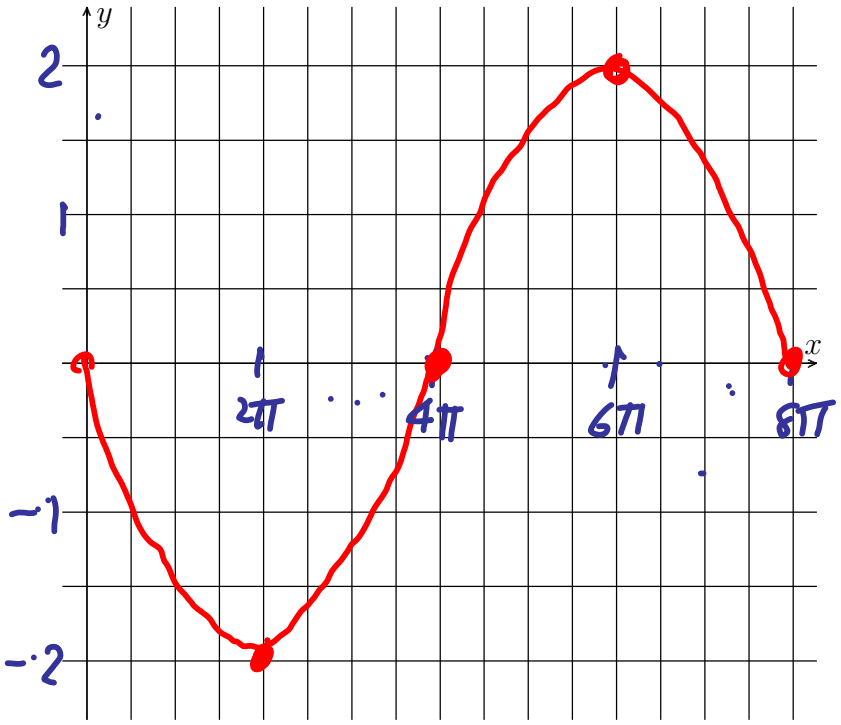
$= 8$


y
x


y
x

Graph

$y = -2\sin\left(\frac{1}{4}x\right)$



Amplitude $|A| = |-2|$

$= 2$

period $p = \frac{2\pi}{B}$

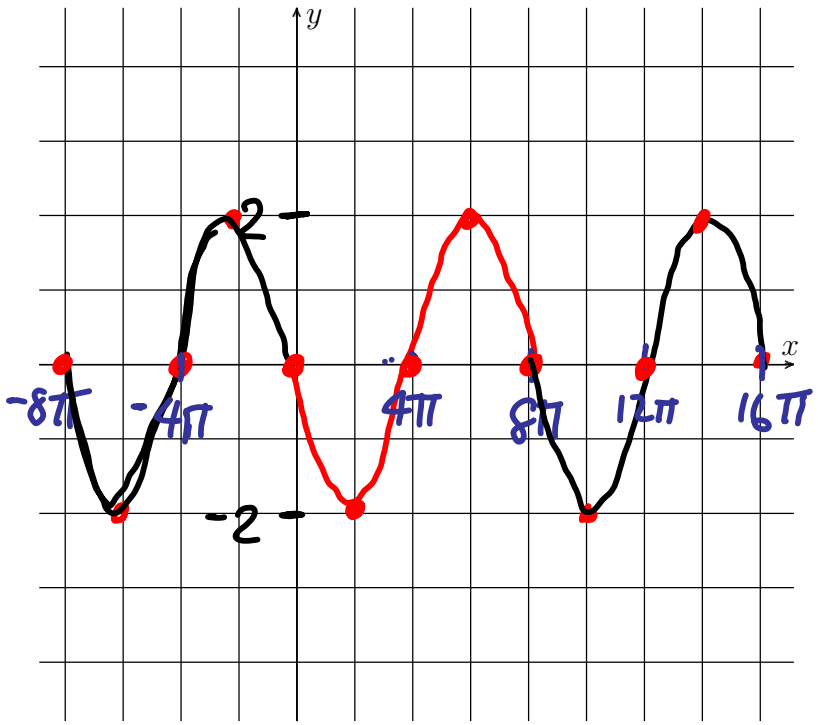
$= \frac{2\pi}{1/4} = 8\pi$

Subintervals

$\frac{8\pi}{4} = 2\pi$

$0 \quad 2\pi \quad 4\pi \quad 6\pi \quad 8\pi$

Extend over 2 periods -



x	$y = -2\sin\left(\frac{1}{4}x\right)$
0	0
2π	-2
4π	0
6π	2
8π	0

Example

$y = A \sin Bx$ $\quad y = A \cos Bx$

which one ?

Find equation of graph.

Graph passes through $(0,0)$

$\therefore$ the graph represents a sine function. $y = A \sin Bx$

Amplitude $|A| = 2$

The period is 4 $\therefore$ $p = \boxed{\frac{2\pi}{B} = 4}$

$\Rightarrow 2\pi = 4B$

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

$y = A \sin\left(\frac{\pi}{2}x\right)$

graph pass through $(1, -2)$

$-2 = A \underbrace{\sin\left(\frac{\pi}{2} \cdot 1\right)}_{1}$

$$-2 = A \cdot (1)$$

$$-2 = A$$

$$\boxed{y = -2 \sin\left(\frac{\pi}{2}x\right)}$$

Example

Period, Amplitude & phase shift.

$$y = 4 \cos(x + \pi)$$

$$\text{period } p = \frac{2\pi}{B} = \frac{2\pi}{1} = 2\pi$$

$$\text{Amplitude } |A| = 4$$

$$\text{phase shift} : -\frac{C}{B} = -\frac{\pi}{1}$$

$$= -\pi$$

b) $y = -7\sin(4x-3)$

$= -7\sin\left(4\left(x-\frac{3}{4}\right)\right)$

$A = -7,\ B = 4,\ C = -3$

Amplitude $|A| = 7$

period $= \frac{2\pi}{B} = \frac{2\pi}{4} = \frac{\pi}{2}$

phase shift: $-\frac{C}{B} = -\frac{(-3)}{4} = \frac{3}{4}$

c) $y = \frac{1}{2}\sin\left(\frac{1}{3}x + \pi\right)$

$= \frac{1}{2}\sin\left(\frac{1}{3}(x + 3\pi)\right)$

Amplitude $|A| = \frac{1}{2}$

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

$= \frac{2\pi}{1/3} = 6\pi$

phase shift $-\frac{C}{B} = -\frac{\pi}{1/3}$

$= -3\pi$