

No
Warm up
😊

HW help ↗

•

Questions
on
HW

Answers to
top part →

A.

Determine the amplitude and period of each function.

a) $y = \sin 4x$

$A = 1$ Per = $\frac{\pi}{2}$

b) $y = \cos 5x$

$A = 1$ Per = $\frac{2\pi}{5}$

c) $y = 4 \cos x$

$A = 4$ Per = 2π

d) $y = -2 \sin x$

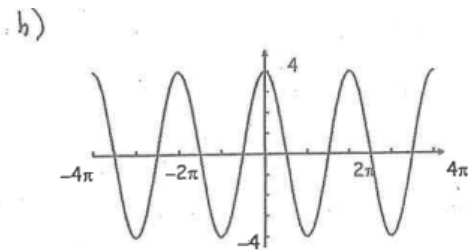
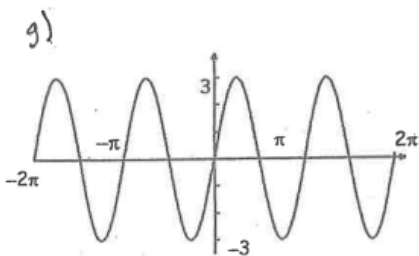
$A = 2$ Per = 2π

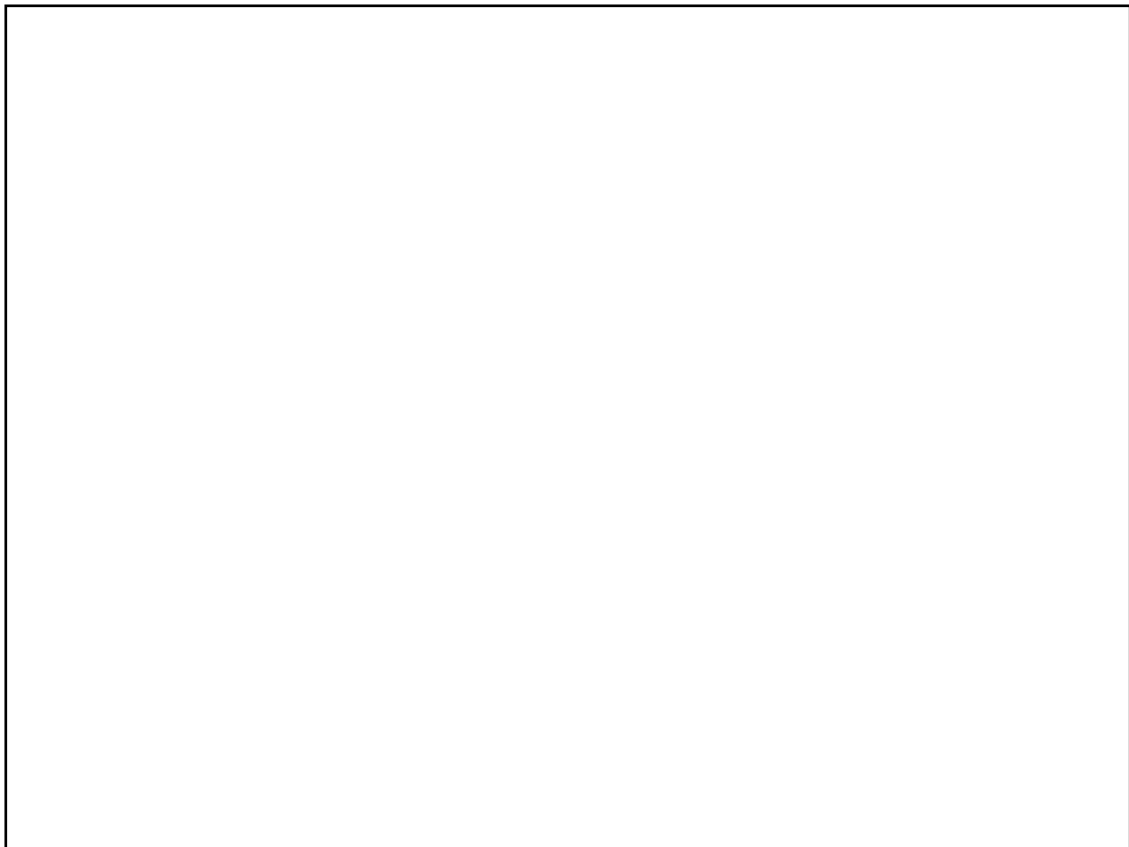
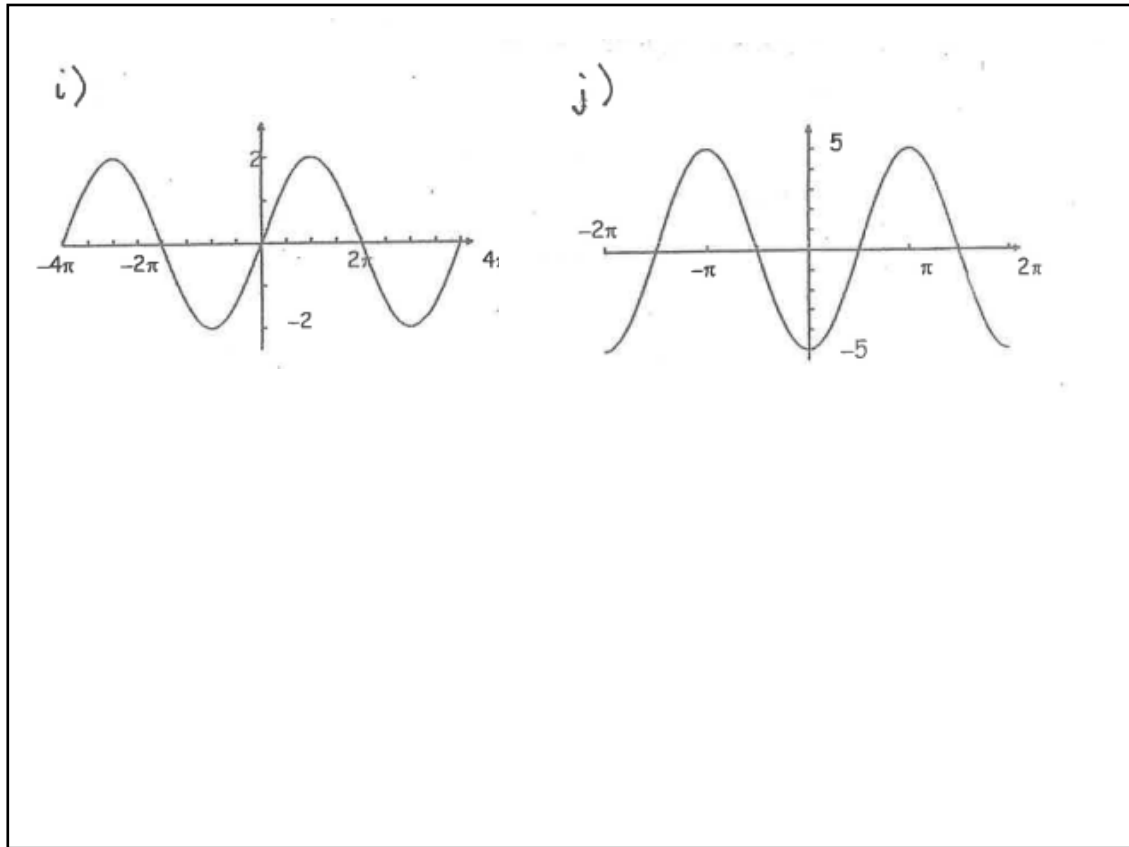
e) $y = 3 \sin \frac{2}{3}x$

$A = 3$ Per = 3π

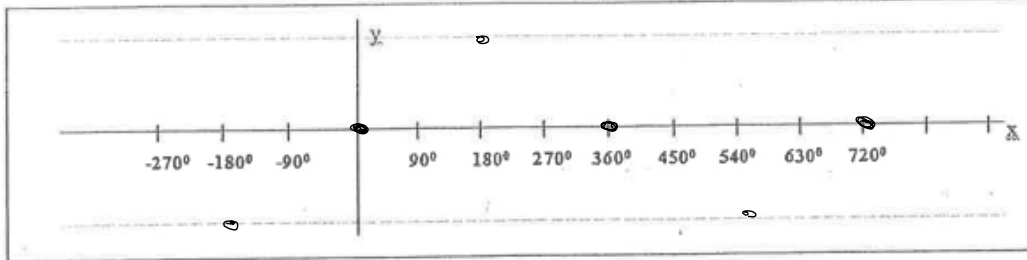
f) $y = -4 \cos 5x$

$A = 4$ Per = $\frac{2\pi}{5}$

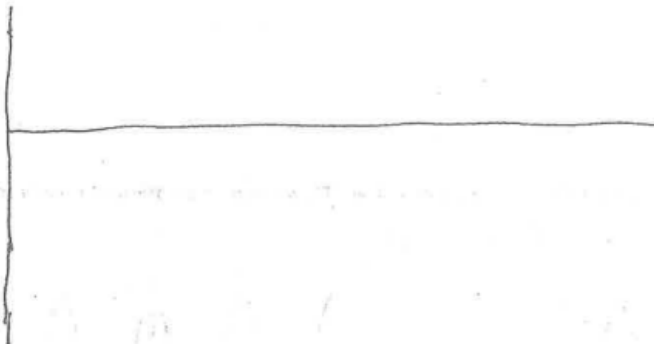




2. Graph $y = 3 \sin\left(\frac{1}{2}\theta\right)$



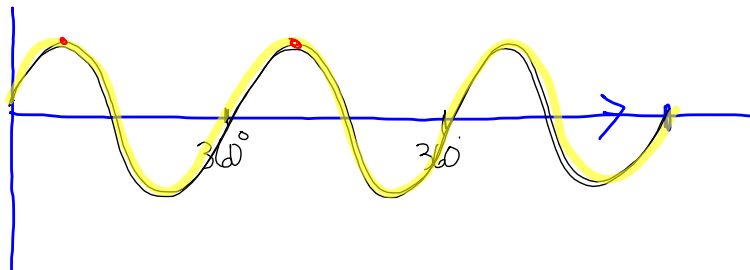
D. Sketch and label 1 cycle of
 $y = 6 \cos(\theta) - 3$



Part 2 Homework
from textbook 7... 130, 132-133, 134b

- do on separate paper
- staple underneath this sheet

7-130. Claudia graphed $y = \cos\theta$ and $y = \cos(\theta + 360^\circ)$ on the same set of axes. She did not see any difference in their graphs at all. Why not? [Homework Help](#)



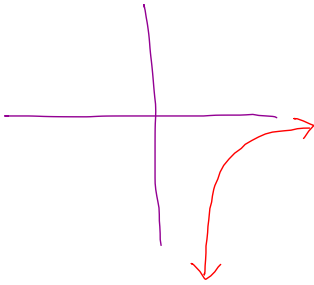
7-132. Find the x - and y -intercepts of the graphs of each of the following equations.

Homework Help 

a. $y = 2x^3 - 10x^2 - x$

b. $y + 2 = \log_3(x - 1)$

$y = \log_3(x) - 2$



y -int
set $x = 0$
 $y + 2 = \log_3(0 - 1)$

a. $y = 2x^3 - 10x^2 - x$

y -int $(0,)$


$0 = 2x^3 - 10x^2 - x$

X-int
set $y=0$

$$2 = -\log_3(x-1)$$

$$3^2 = x-1$$

$$x = 10$$

7-134. Change each equation to graphing form. For each equation, find the domain and range and determine if it is a function. [Homework Help](#) 

a. $y = -2x^2 - x + 13$

b. $y = -3x^2 - 6x + 12$

133 COST OF MOVIE \$9.50
increasing 4% per year

$$\text{multiplier: } 100\% + 4\% = 104\% \\ \downarrow \\ 1.04$$

DOUBLED
COST will be
\$19.00

$$y = ab^x$$

$$19 = 9.50 (1.04)^t$$

divide

$$\frac{19}{9.50} = (1.04)^t$$

7-136. Deniz's computer is infected with a virus that will erase information from her hard drive. It will erase information quickly at first, but as time goes on, the rate at which information is erased will decrease. In t minutes after the virus starts erasing information, $5,000,000(\frac{1}{2})^t$ bytes of information remain on the hard drive. [Homework Help](#)

a. Before the virus starts erasing, how many bytes of information are on Deniz's hard drive? $5,000,000$

b. After how many minutes will there be 1000 bytes of information left on the drive?

c. When will the hard drive be completely erased? (never...theoretically)

$$1000 = 5,000,000\left(\frac{1}{2}\right)^x$$

Today

Today

Analyse and/or graph

Periodic Functions

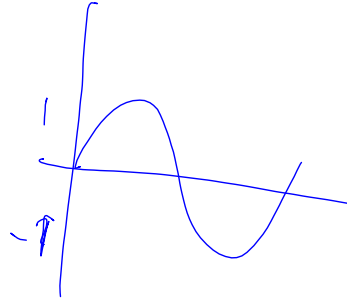
(using all 4 parameters)

a b h k

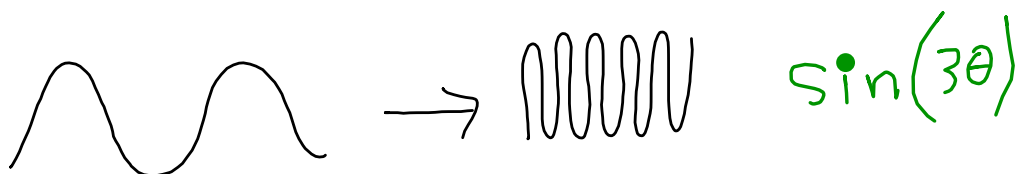
The big idea

In order to model sine (or cosine) waves that occur in real situations, we need to be able to position the wave anywhere in the coordinate plane.

Thus, we have a need to make both scale changes and translations to our waves.



Continuing from yesterday... $\frac{3\theta}{4}$



The general equation

$$y = a \sin[b(x-h)] + k$$

Vertical stretch/shrink
 horizontal stretch/shrink factor
 left/right shift
 midline

What is the relationship between the period of a sine graph and the value of **b** in its equation?

$$y = \sin(bx)$$

NOTES

what do we know about

$$y = \sin(bx) \quad ??$$

b tells the number of cycles in 2π

$$\text{Period (length)} = \frac{2\pi}{b}$$

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

b tells the number of cycles in 2π
or 360°

$$\text{Period (length)} = \frac{2\pi}{b}$$

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

$$\text{Per} = \frac{360^\circ}{b}$$

$$b = \frac{360^\circ}{\text{Period}}$$

A.

Determine the amplitude and period of each function.

a) $y = \sin 4x$

b) $y = \cos 5x$

c) $y = 4 \cos x$

d) $y = -2 \sin x$

e) $y = 3 \sin \frac{2}{3}x$

f) $y = -4 \cos 5x$

Sketch

Artists

No calculator \rightarrow describe \rightarrow sketch \rightarrow check with graphing calculator

① $y = 3 \sin(4x)$

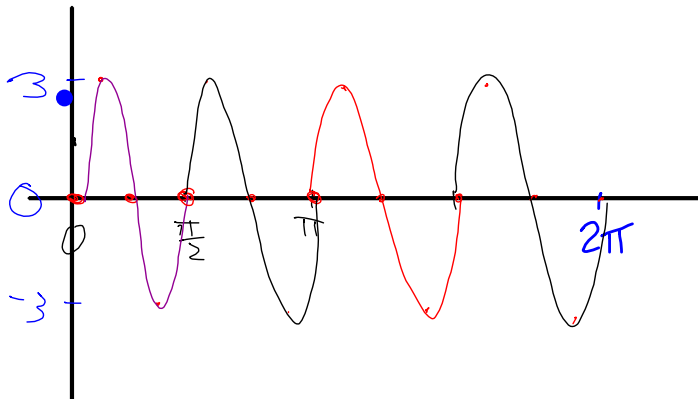
Amplitude $\rightarrow A = 3$

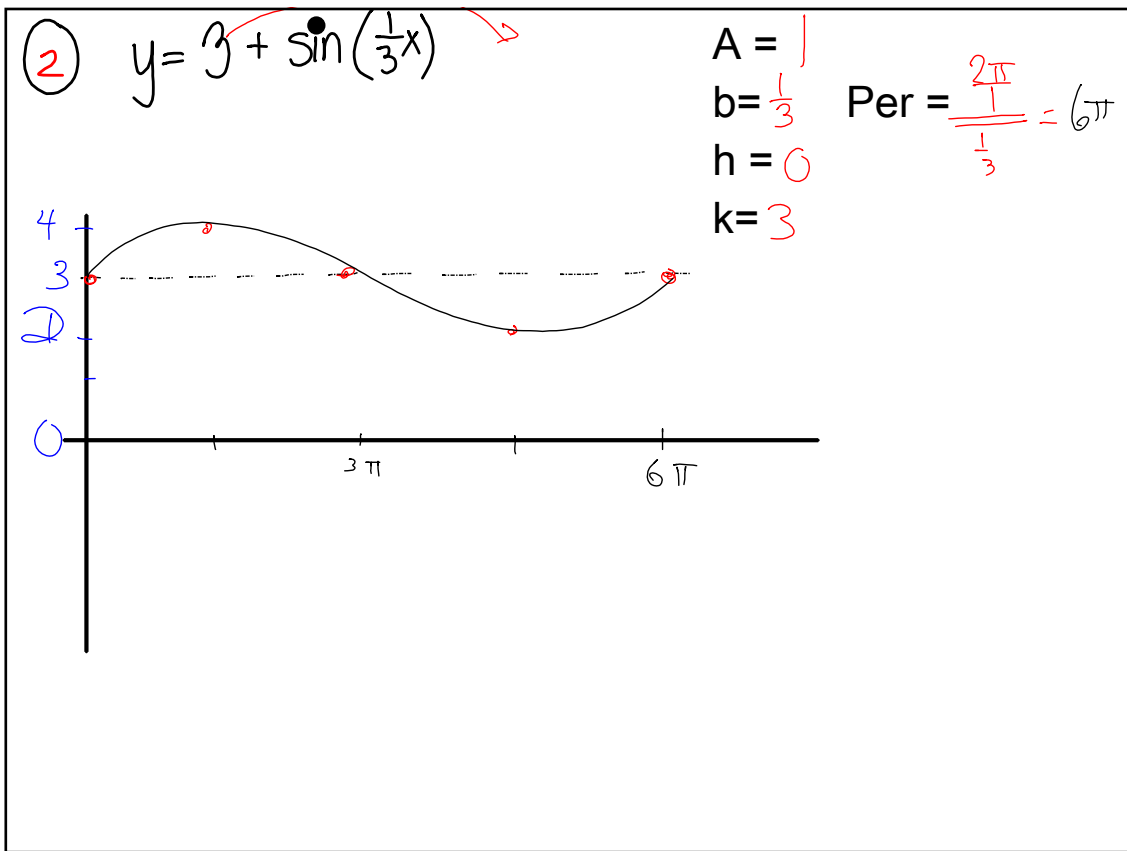
$b = 4$

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

$h = 0$

$k = 0$





$$\frac{\frac{2\pi}{1}}{\frac{1}{3}} = \frac{2\pi}{1} \cdot \frac{3}{1}$$

6π

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

$$A = 1$$

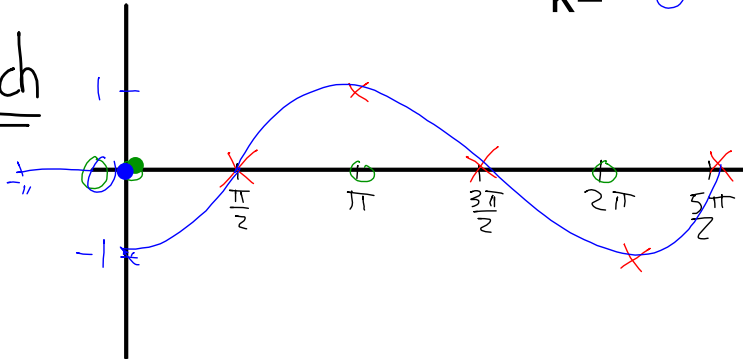
$$b = 1$$

$$\text{Per} = \frac{2\pi}{1} = 2\pi$$

$$h = \frac{\pi}{2} \text{ right}$$

$$k = 0$$

Sketch



at least
one full
cycle
or more

check
after
GDC

BACKWARDS

(A) $y = \cos(\frac{1}{2}x) + 2$

$\frac{360}{720} = \frac{1}{2}$

$A = 1$
 $\text{Per} = 720^\circ$ $b = \frac{1}{2}$
 $h = 2$
 $k = 2$

(B) $y = -4 \cos(2x)$

$A = 4$
 $b = 2$ ← $\frac{2\pi}{\pi} = 2$
 $h = -\frac{\pi}{2}$
 $k = 0$
 $P = \pi$
 $y = 4 \sin\left[2\left(x - \frac{\pi}{4}\right)\right]$

(C) $P = \frac{360}{3} = 120^\circ$

$y = 2 \sin(3x)$

$b = \frac{360}{120} = 3$

$A = 2$
 $\text{Per} = 120^\circ$ $b = 3$
 $h = 0$
 $k = 0$

(D)

$y = 3 \cos(4x)$

$b = \frac{2\pi}{\frac{\pi}{2}} = 2 \cdot \frac{4}{1} = 8$

Partner
LCQ

Assignment:

Worksheet : Assignment 7.2.3

• in other words...

$$y = \sin(bx)$$

We really need to get to know **b** in depth.

→ Complete the handout

Make sure your graphing calculator is in radian mode. Set the domain and range of the y just one complete cycle of $y = \sin x$. What is the domain for one cycle? What is the range?

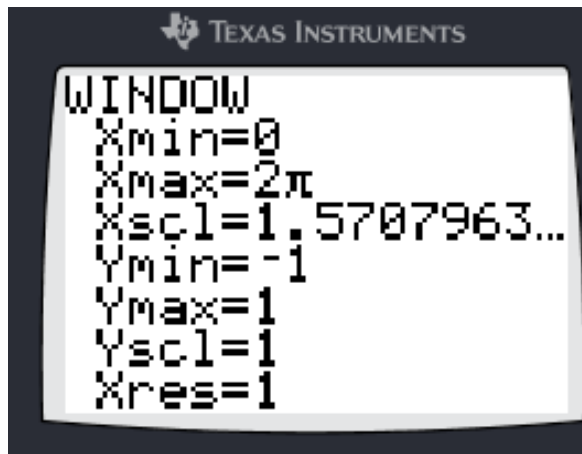
	$y = \sin(x)$	$y = \sin(0.5x)$	$y = \sin(2x)$	$y = \sin(x)$
How many cycles appear on the screen (in 2π)?				
Sketch of graph				
Midline (equation)				
Amplitude				
Period (cycle length) in radians				
a function?				

a) Make a conjecture about the graph of $y = \sin(kx)$ with respect to each of the questions

Window

radians

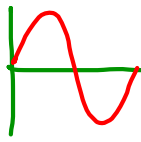
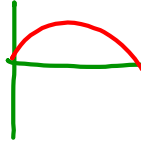
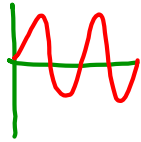
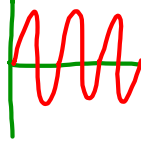
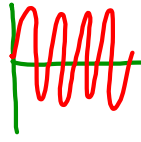
$$0 < \theta < 2\pi$$



Make sure your graphing calculator is in radian mode. Set the domain and range of the viewing window so that you would see just one complete cycle of $y = \sin x$. What is the domain for one cycle? What is the range? Now complete the table below.

	$y = \sin(x)$	$y = \sin(0.5x)$	$y = \sin(2x)$	$y = \sin(3x)$	$y = \sin(5x)$	
How many cycles appear on the screen (in $0 \leq x \leq 2\pi$)?						
Sketch of graph						
Midline (equation)						
Amplitude						
Period (length of 1 cycle) in radians						
a function ?						

Make sure your graphing calculator is in radian mode. Set the domain and range of the viewing window so that you would see just one complete cycle of $y = \sin x$. What is the domain for one cycle? What is the range? Now complete the table below.

	$y = \sin(x)$	$y = \sin(0.5x)$	$y = \sin(2x)$	$y = \sin(3x)$	$y = \sin(5x)$	$y = \sin(bx)$
How many cycles appear on the screen (in 2π)?	1	$\frac{1}{2}$	2	3	5	b
Sketch of graph						
Midline (equation)	$y = 0$	$y = 0$	$y = 0$	$y = 0$	$y = 0$	$y = 0$
Amplitude	1	1	1	1	1	1
Period (cycle length) in radians	2π	4π	π	$\frac{2\pi}{3}$	$\frac{2\pi}{5}$	$\frac{2\pi}{b}$
a function?	yes	yes	yes	yes	yes	yes

a) Make a conjecture about the graph of $y = \sin(bx)$ with respect to each of the questions above.