

F.S.T.
Chapter 4b (4-6 to 4-9) Review

Name KEY
Block _____ Date _____

Non-Calculator

For each function, a) List the amplitude, period, x-intercepts, y-intercept, and vertical asymptotes (if any), and b) Graph the function for all $x: -\pi \leq x \leq 2\pi$

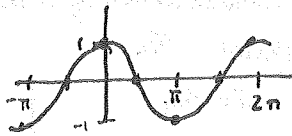
1. $y = \sin x$

amp = 1
period = 2π
y-int: 0
x-int: $-\pi, 0, \pi, 2\pi$



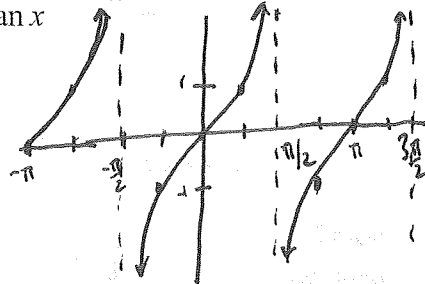
2. $y = \cos x$

amp = 1
period = 2π
y-int = 1
x-int = $-\pi/2, \pi/2, 3\pi/2$



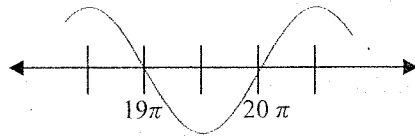
3. $y = \tan x$

no amp
period = π
y-int = 0
x-int = $0, \pi, -\pi$



4. Below is part of the graph of a function f . Which of the following could be an equation for f : $f(x) = \cos x$ or $f(x) = \sin x$? Justify your answer.

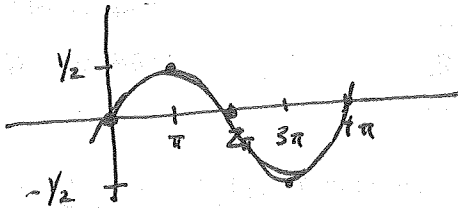
x-intercepts are whole values of π .



In problems 6-12, list the period, amplitude, phase shift and vertical shift of the given function. Give the equations of two asymptotes (if any). Then, draw at least one cycle of the graph of the given function

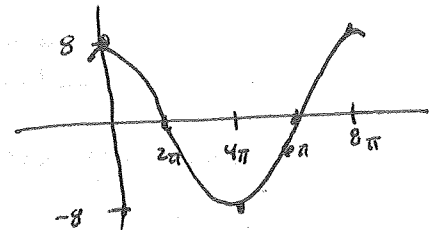
5. $y = \frac{1}{2} \sin\left(\frac{1}{2}x\right)$

a = $\frac{1}{2}$
per = 4π
no phase shift
no vertical shift



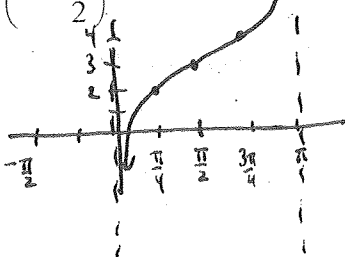
6. $y = 8 \cos\left(\frac{1}{4}x\right)$

amp = 8
Period = 8π
no phase shift
no vertical shift



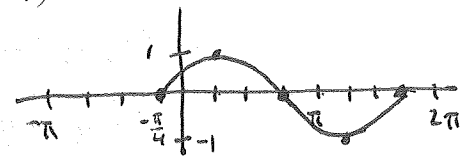
7. $y = \tan\left(x - \frac{\pi}{2}\right) + 3$

no amp
period = π
Rt $\pi/2$
up 3



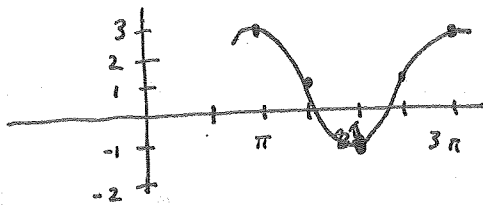
8. $y = \sin\left(x + \frac{\pi}{4}\right)$

amp = 1
per = 2π
Left $\pi/4$
no vertical shift



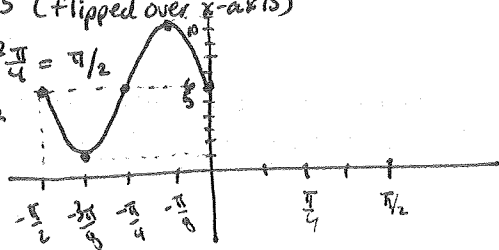
9. $y = 2\cos(x - \pi) + 1$

amp = 2
per = 2π
Rt π
Up 1



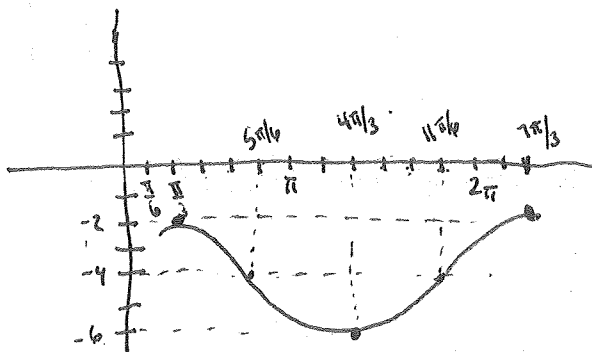
10. $y = 6 - 5\sin\left(4\left(x + \frac{\pi}{2}\right)\right)$

amp = 5 (flipped over x-axis)
Period = $\frac{2\pi}{4} = \pi/2$
Left $\pi/2$
Up 6



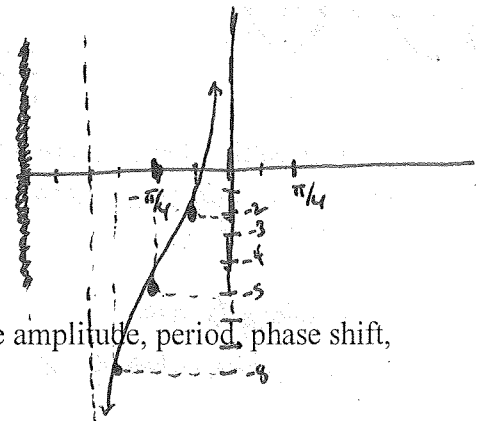
11. $y = -4 + 2\cos\left(x - \frac{\pi}{3}\right)$

Amp = 2
Period = 2π
Right $\pi/3$
Down 4



12. $y = 3\tan\left(2\left(x + \frac{\pi}{4}\right)\right) - 5$

vertical stretch by a factor of 3
Period = $\pi/2$
Left $\pi/4$
Down 5



13. Write the equation of a cosine function under $S(x, y) \rightarrow (2x, y)$. List the amplitude, period, phase shift, and vertical shift.

$y = \cos\left(\frac{x}{2}\right)$

no shift

Amp = 1
Period = 4π

no shifts!

14. Write the equation of a tangent function under $T(x, y) \rightarrow \left(x - \frac{\pi}{3}, y + 2\right)$. List the amplitude, period, phase shift, and vertical shift.

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

Left $\pi/3$ up 2

Amp is n/a

PERIOD = π

15. Write the equation of a sine function whose amplitude is $\frac{1}{3}$, period is 4π , phase shift is π , and vertical shift is -1 .

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

= $+\pi$

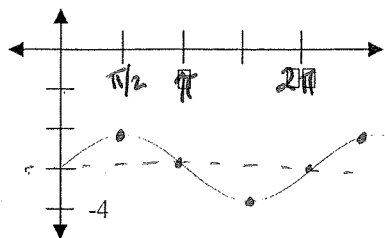
= Right π

16. Write the equation of a cosine function whose amplitude is 4, period is $\frac{\pi}{2}$, and phase shift is $-\frac{3\pi}{2}$.

$y = 4\cos\left(4\left(x + \frac{3\pi}{2}\right)\right)$

In 17-22 list the period, amplitude, phase shift and vertical shift. Then, write the equation of the given graph based on the given function.

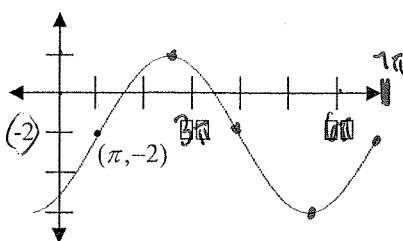
17. $y = \cos x$



Right $\pi/2$
Down 3
Period = 2π
Amp = 1

$$y = \cos(x - \pi/2) - 3$$

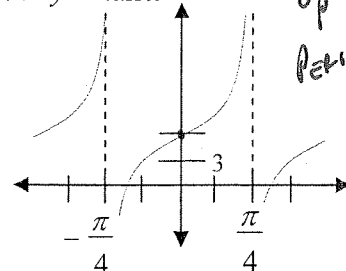
18. $y = \sin x$



Period = 6π
Amp = 4
Right π
Down 2

$$y = 4\sin\left(\frac{1}{3}(x - \pi)\right) - 2$$

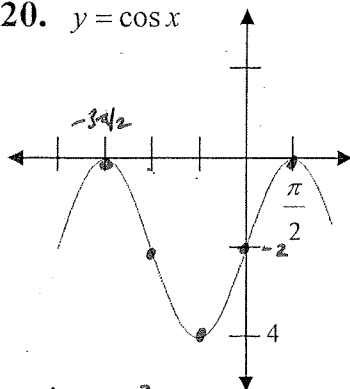
19. $y = \tan x$



Up 6
Period = $\pi/2$

$$y = \tan(2x) + 6$$

20. $y = \cos x$



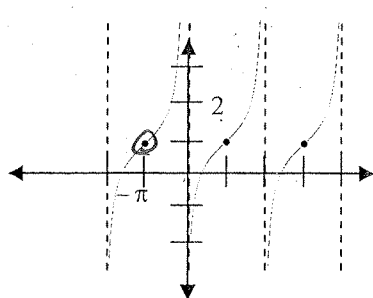
Amp = 2
Period = 2π
Down 2
Left $3\pi/2$

$$y = 2\cos\left(x + 3\pi/2\right) - 2$$

NOTE... Right $\pi/2$ would work too.

$$y = 2\cos\left(x - \pi/2\right) - 2$$

21. $y = \tan x$



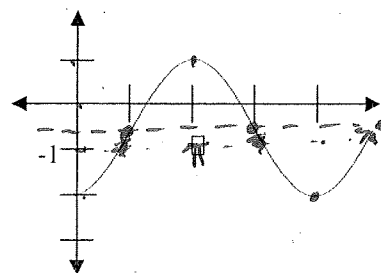
Period = 2π
Left π
Up 1

$$y = \tan\left(\frac{1}{2}(x - \pi)\right) + 1$$

Right π would work as well

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

22. $y = \sin x$



Right $\pi/2$
Down $1/2$
Period = 2π
Amp = $1\frac{1}{2} = \frac{3}{2}$

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