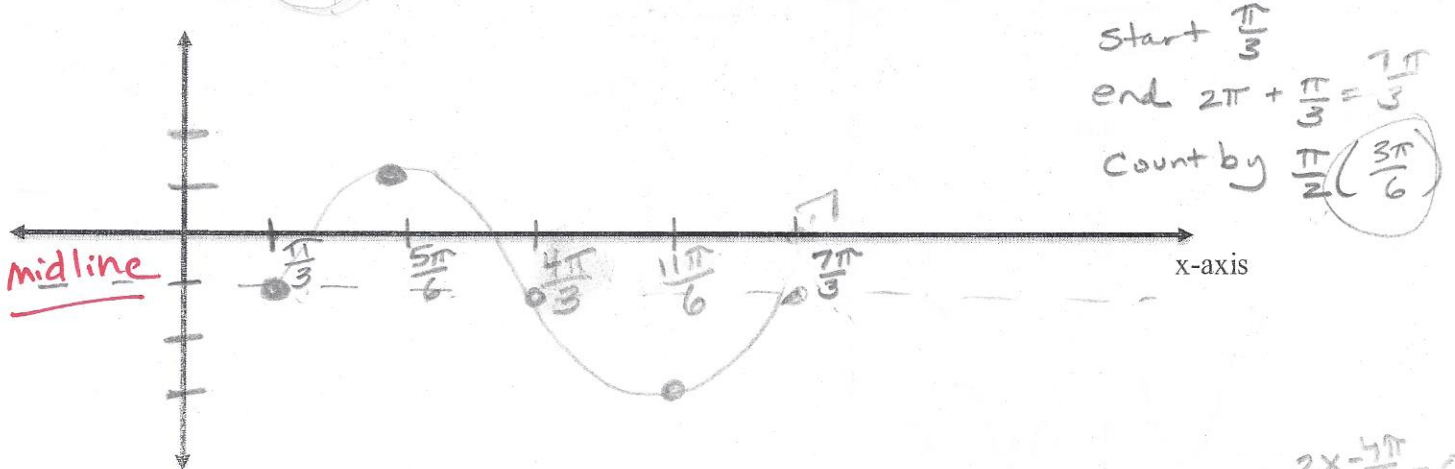


I. Find the amplitude, period, phase shift, vertical shift, midline equation, and range of the following:

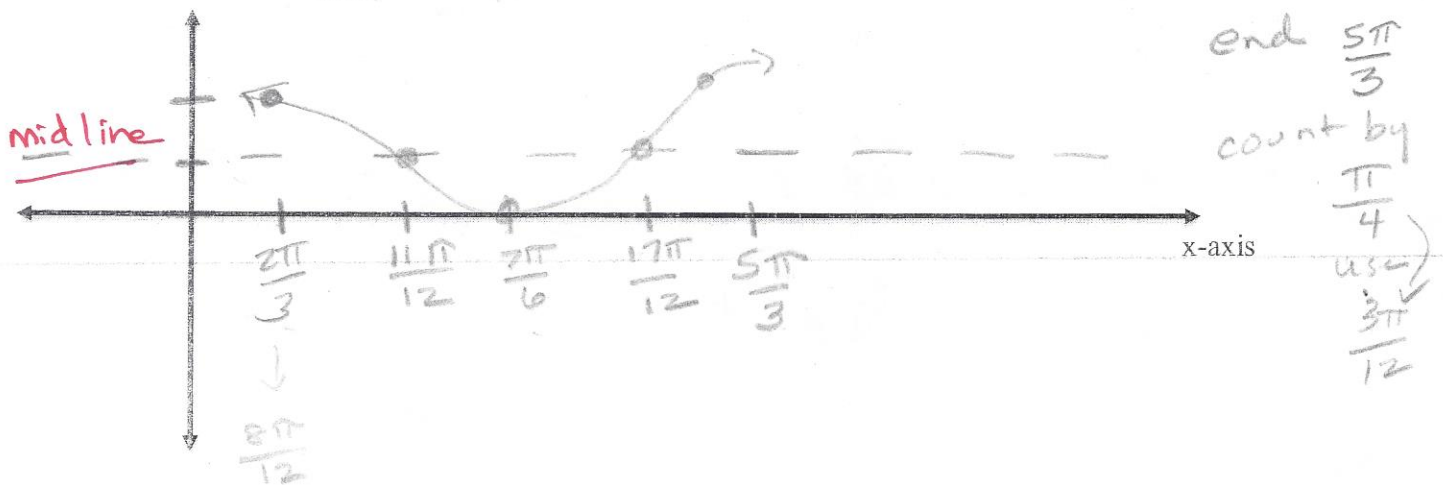
- | | | | | |
|--|---|-------------------------|---------------|----------------|
| a. $f(x) = 5 + 2 \sin(3x)$ | $a=2$ | period $\frac{2\pi}{3}$ | vertical $+5$ | midline $y=5$ |
| b. $f(x) = -7 \cos[2(x + \pi)]$ | no phase shift
left shift π
$- \pi$ | 7 | π | none
$y=0$ |
| c. $f(x) = -\sin(x + \pi) - 2$ | left π | 1 | 2π | -2
$y=-2$ |
| d. $f(x) = 1 - 3 \cos(2x - \frac{\pi}{3})$ | right $\frac{\pi}{6}$ | 3 | π | $+1$
$y=1$ |

II. Graph by hand. Graph at least 1 wavelength and label the axes and the 5 critical points.

- a. $f(x) = 2 \sin(x - \frac{\pi}{3}) - 1$
- $a=2$ $b=1$ midline $y=-1$
 $per=2\pi$

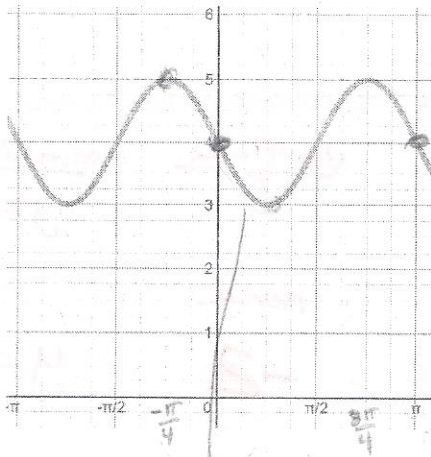


- b. $f(x) = 1 + \cos(2x - \frac{4\pi}{3})$
- $a=1$ $b=2$ $per = \pi$
- start $2x - \frac{4\pi}{3} = 0$
 $x = \frac{2\pi}{3}$



III. Write a sine and cosine functions for the graphs below:

a.



period = π

$b = 2$

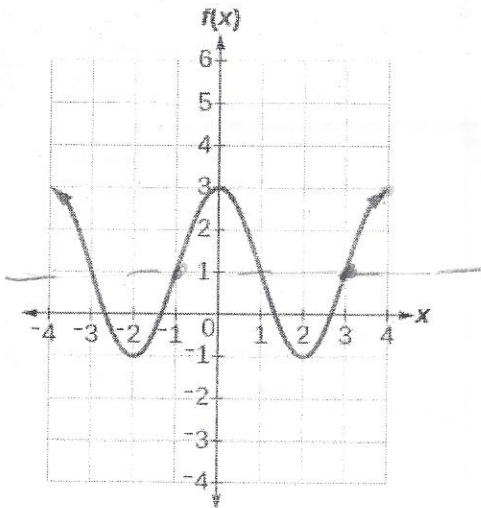
$\frac{2\pi}{b} = \pi$

Sine: $y = -\sin 2\theta + 4$

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

There are many answers

b.



period = 4
(one cycle)

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

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

Sine: $y = 2 \sin \frac{\pi}{2}(x+1) + 1$ OR $-2 \sin \frac{\pi}{2}(x-1) + 1$

Cosine: $y = 2 \cos \frac{\pi}{2} x + 1$

Many answers