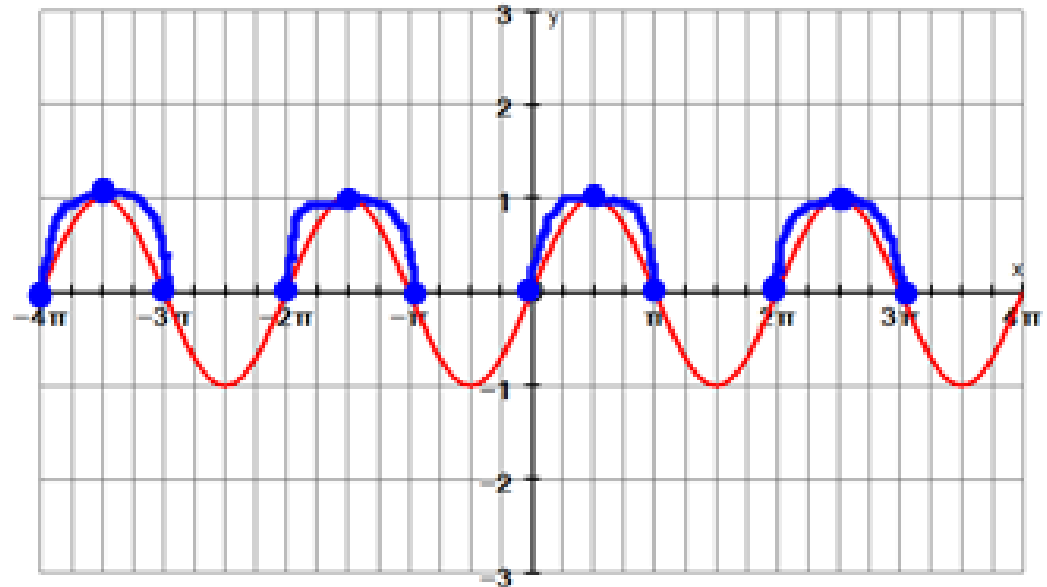


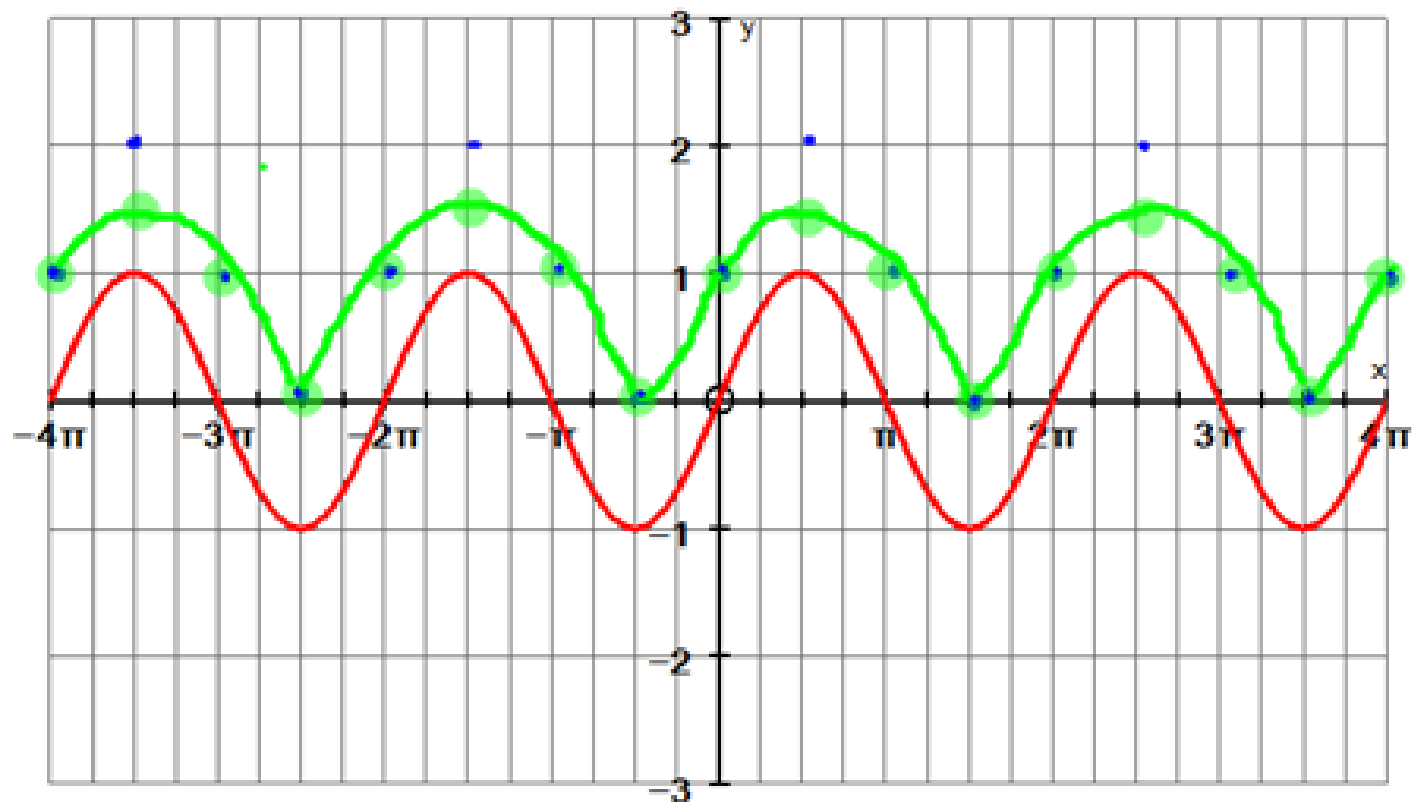
23. Consider the function $y = \sqrt{\sin x}$.
- Use the graph of $y = \sin x$ to sketch a prediction for the shape of the graph of $y = \sqrt{\sin x}$.
 - Use graphing technology or grid paper and a table of values to check your prediction. Resolve any differences.
 - How do you think the graph of $y = \sqrt{\sin x + 1}$ will differ from the graph of $y = \sqrt{\sin x}$?
 - Graph $y = \sqrt{\sin x + 1}$ and compare it to your prediction.



Ⓐ SQUARE ROOTS OF NUMBERS < 1 ARE LARGER THAN THE ORIGINAL NUMBERS, SO $\sqrt{\sin x}$ GRAPH WILL BE ABOVE $\sin x$ GRAPH

Ⓒ ORIGINAL GRAPH SHIFTS UP $\rightarrow y = \sin x + 1$ IS ABOVE THE x -AXIS, SO EVERYTHING CAN BE SQUARE ROOTED.

(GRAPH) ↓



$$y = \sin x + 1 \quad (\text{POINTS ONLY})$$

$$y = \sqrt{\sin x + 1}$$

ch 5.2 Pg 252 #11

11. A family of sinusoidal graphs with equations of the form $y = a \sin b(x - c) + d$ is created by changing only the vertical displacement of the function. If the range of the original function is $\{y \mid -3 \leq y \leq 3, y \in \mathbb{R}\}$, determine the range of the function with each given value of d .

a) $d = 2$

$$VT = 2$$

$$\{y \mid -1 \leq y \leq 5, y \in \mathbb{R}\}$$

12. Sketch the graph of the curve that results after applying each transformation to the graph of the function $f(x) = \sin x$.

a) $f\left(x - \frac{\pi}{3}\right)$



HT = $\frac{\pi}{3}$

~~b) $f\left(x + \frac{\pi}{4}\right)$~~

~~c) $f(x) + 3$~~

d) $f(x) - 4$



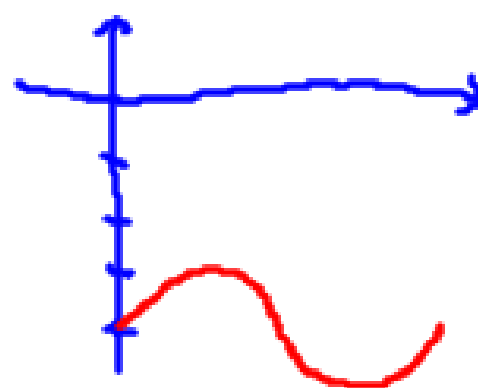
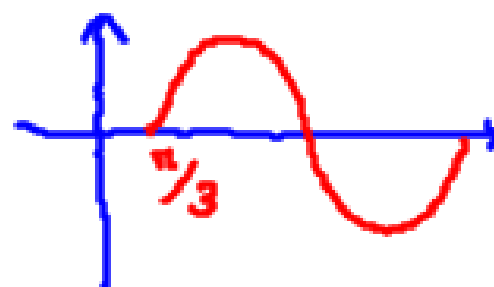
VT = -4

$f(x) = \sin x$

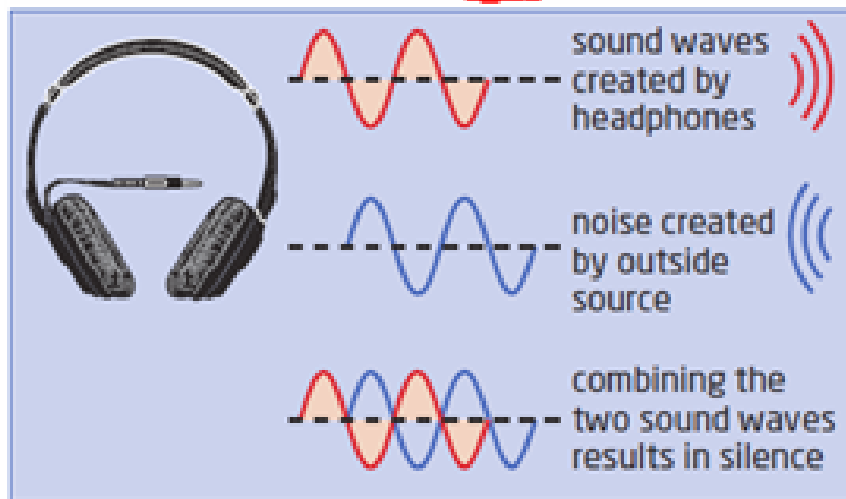
$f(x) - 4 = \sin x - 4$

$f(x) = \sin x$

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



Noise-cancelling headphones are designed to give you maximum listening pleasure by cancelling ambient noise and actively creating their own sound waves. These waves mimic the incoming noise in every way, except that they are out of sync with the intruding noise by **180° HALF PERIOD**



Suppose that the amplitude and period for the sine waves created by the outside noise are 4 and $\frac{\pi}{2}$, respectively. Determine the equation of the sound waves the headphones produce to effectively cancel the ambient noise.

NOISE:

AMP: 4 PERIOD: $\frac{\pi}{2}$

VS = 4 HS = $\frac{\pi/2}{2\pi} = \frac{1}{4}$

$$y = 4 \sin(4x)$$

NOISE

TO SHIFT "OUT OF SYNC"
WE NEED HT OF $\frac{1}{2}$ OF
THE PERIOD:

$$HT = \frac{1}{2} \left(\frac{\pi}{2} \right) = \frac{\pi}{4}$$

$$y = 4 \sin \left[4 \left(x - \frac{\pi}{4} \right) \right]$$

SOUND WAVES

HW: ch 5.1 pg 236 # 19, 20,22

ch5.1 pg 252 #13-16, 24,27