

## 14.2: Shifting Trig Graphs

$$y = a \sin b(x-h) + k \quad \& \quad y = a \cos b(x-h) + k$$

amplitude:  $|a|$

period:  $\frac{2\pi}{|b|}$

Shifts:

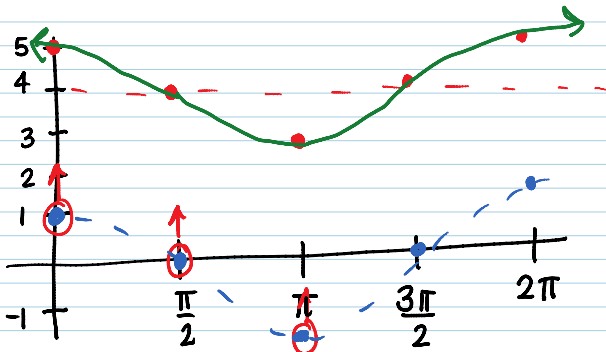
- $+k \Rightarrow$  shifting  $\uparrow k$
- $-k \Rightarrow$  shifting  $\downarrow k$
- $x-h \Rightarrow$  shift  $\rightarrow h$
- $x+h \Rightarrow$  shift  $\leftarrow h$

Graph:

①  $y = \cos x + 4 \quad \uparrow 4$

$$y = \cos x \Rightarrow A = 1$$

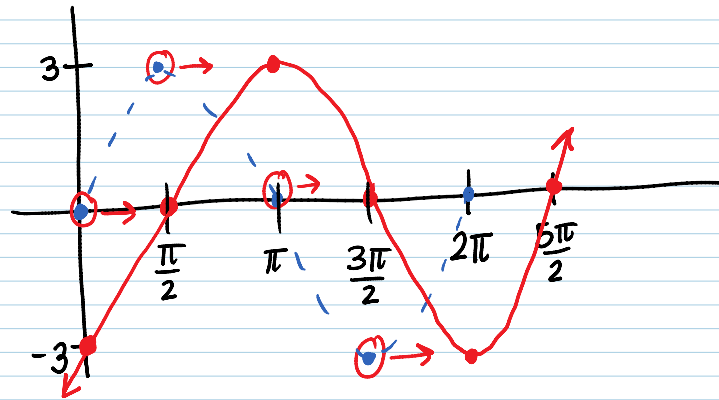
$$P = \frac{2\pi}{1} = 2\pi$$



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

$$y = 3 \sin x \Rightarrow A = 3$$

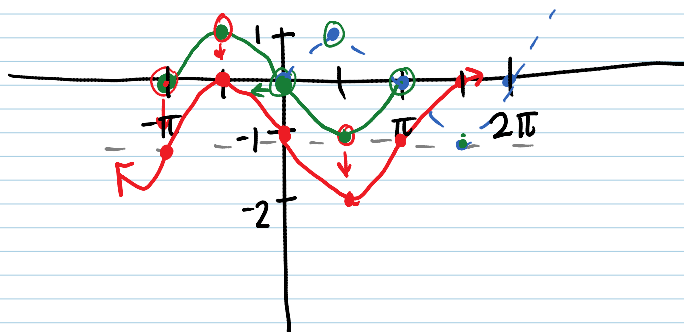
$$P = \frac{2\pi}{1} = 2\pi$$



③  $y = \sin(x + \pi) - 1 \quad \leftarrow \pi$

$$y = \sin x \Rightarrow A = 1$$

$$P = 2\pi$$



④  $y = 2 \cos 4x + 3 \quad \uparrow 3$

$$y = 2 \cos 4x \Rightarrow A = 2$$

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

