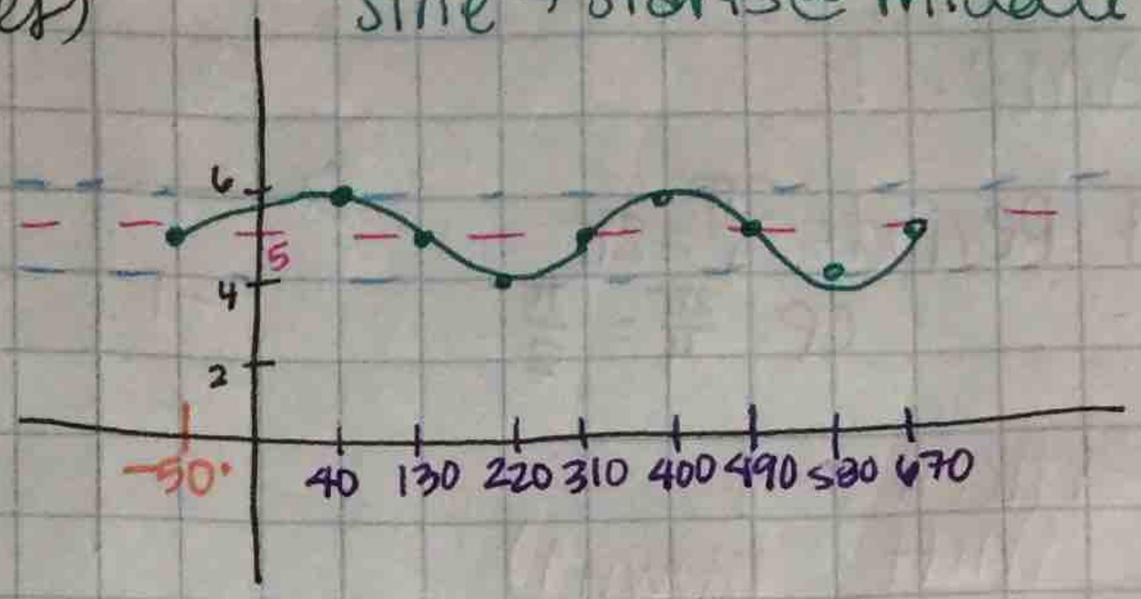
2.2 Horizontal & Vertical Shifts

① $y = \underline{\underline{5}} + |\sin|(x + \boxed{50°})$ (degrees)

sine → starts @ middle



vertical shift: up 5
(C)

horizontal shift: left 50
(D)

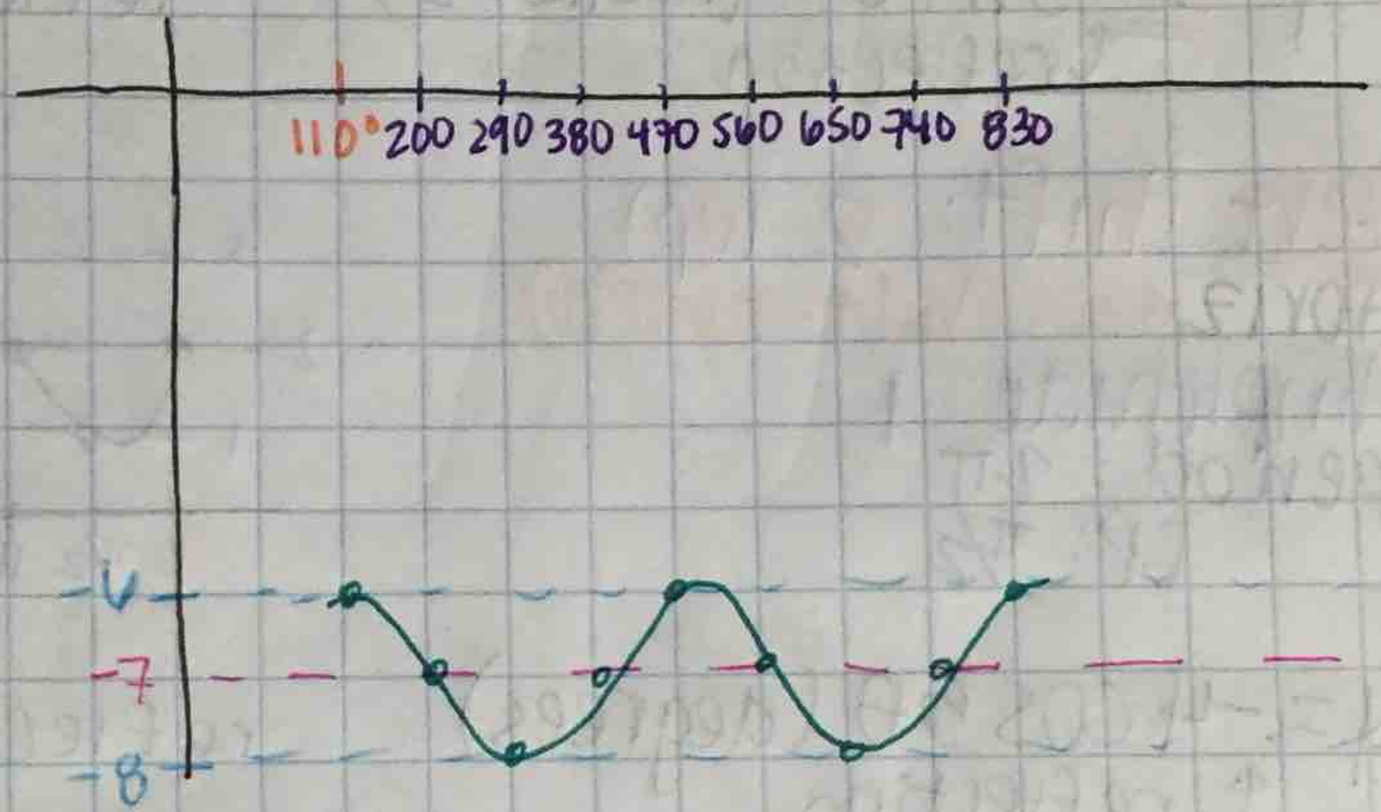
Amplitude: 1
(A)

B: 1 Period $= \frac{360}{1} = 360°$

CP: $\frac{360°}{4} = 90°$

② $y = \underline{\underline{-7}} + |\cos|(\theta + \boxed{110°})$ (degrees)

cosine → starts @ high



(C) sinusoidal axis: -7

(D) phase shift: $110°$

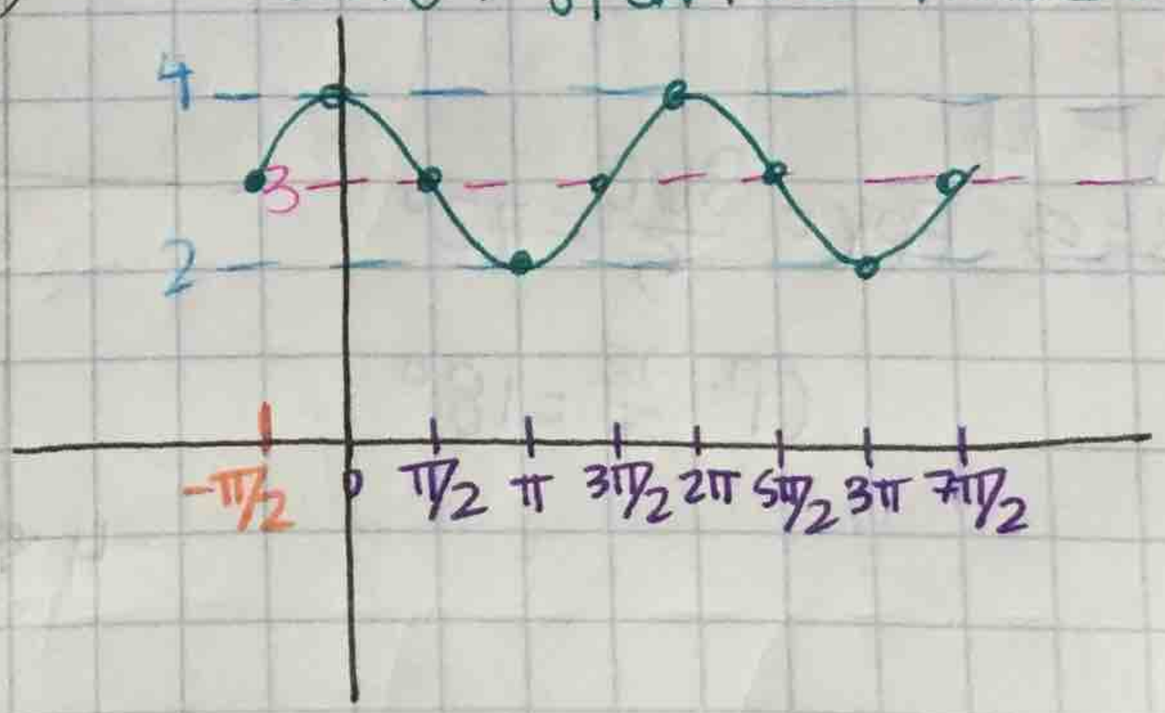
(A) Amplitude: 1

(B) Period: $\frac{360}{1} = 360°$

CP: $90°$

③ $y = \underline{\underline{3}} + |\sin|(\theta + \boxed{\frac{\pi}{2}})$ (radians)

sine → starts @ middle



$C = 3$

$D = -\pi/2$

$A = 1$

$B = 1 \rightarrow$ Per: $\frac{360}{1} = 360° = 2\pi$

CP: $90° \quad \frac{2\pi}{4} = \frac{\pi}{2}$

④ $y = -1 - \cos 1(\theta - \pi)$ (radians) reflected cos → starts @ low
$=$ ↑ reflection

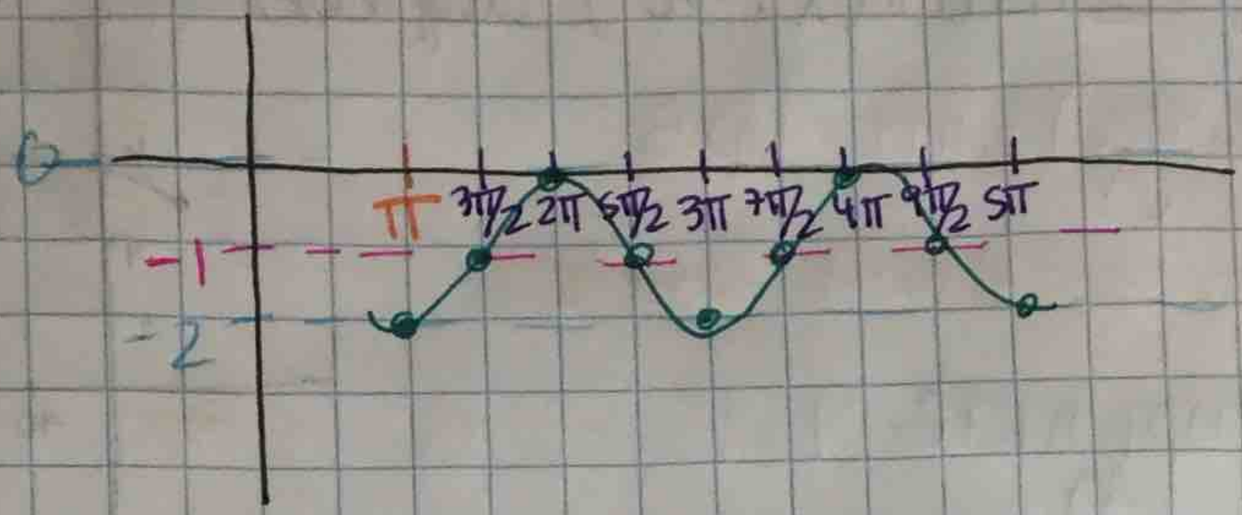
Amp: 1

B=1 Period = $\frac{2\pi}{1} = 2\pi$

CP: $\frac{2\pi}{4} = \frac{\pi}{2}$

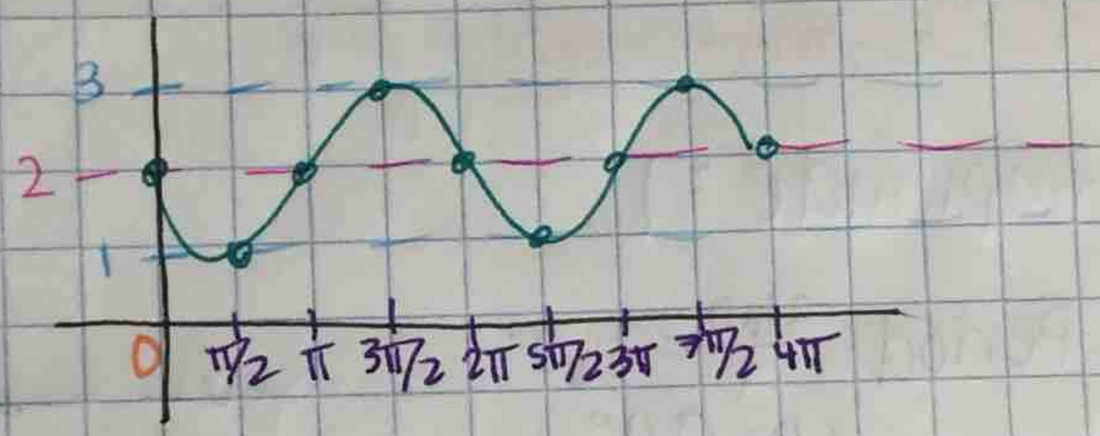
Vertical: −1
Shift (down 1)

Horizontal: π
Shift (right)



⑤ $y = 2 - \sin\theta$ (radians) reflected sin → middle going DOWN
$=$ ↑ reflection

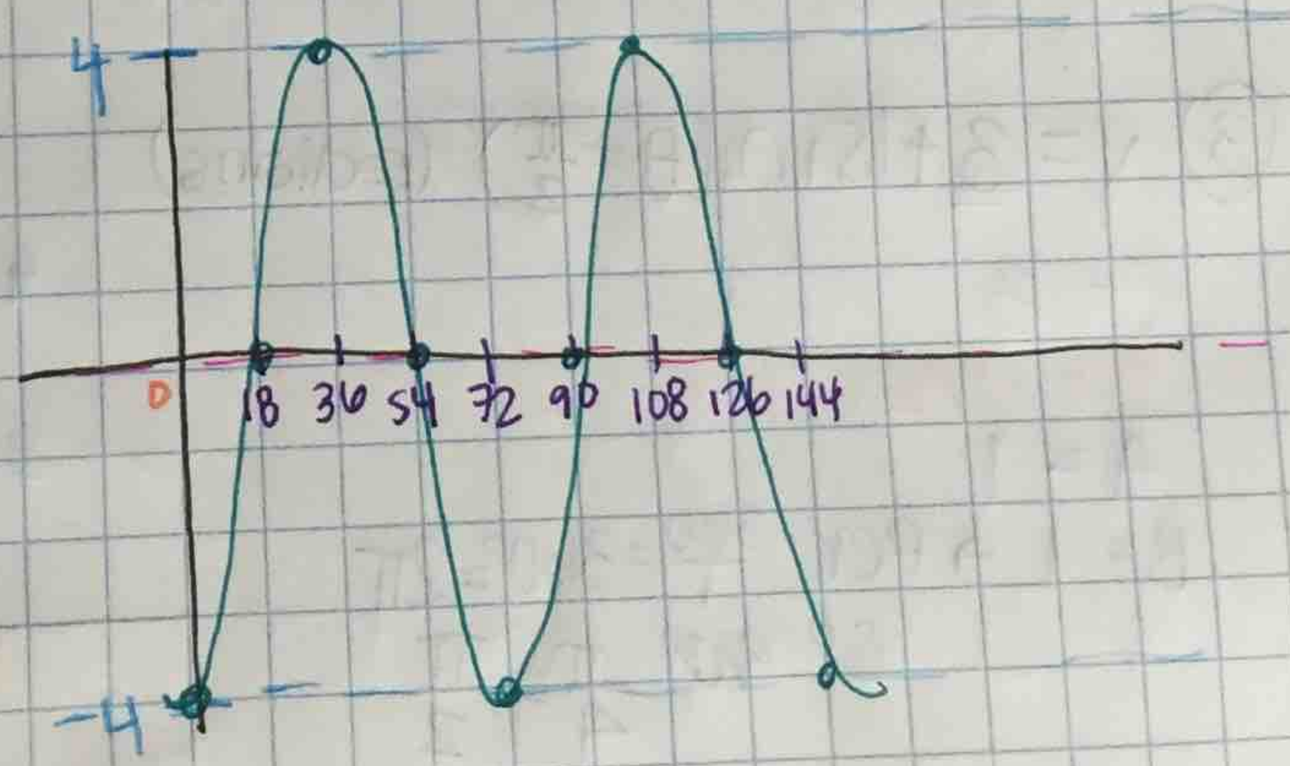
Vert. Shift: 2 (up)
Horizontal Shift: none (0)
Amplitude: 1
period: 2π
CP: π/2



⑥ $y = -4\cos 5\theta$ (degrees) reflected cos → starts at low
↑ reflection

C = 0
D = 0
A = 4
B = 5 Per = $\frac{360}{5} = 72°$

CP: $\frac{72}{4} = 18°$



⑦ $y = \underline{6} + \underline{7}\sin\underline{1}x$ (radians)

sin → mid going UP.

high pt: $6+7=13$ low pt: $6-7=-1$

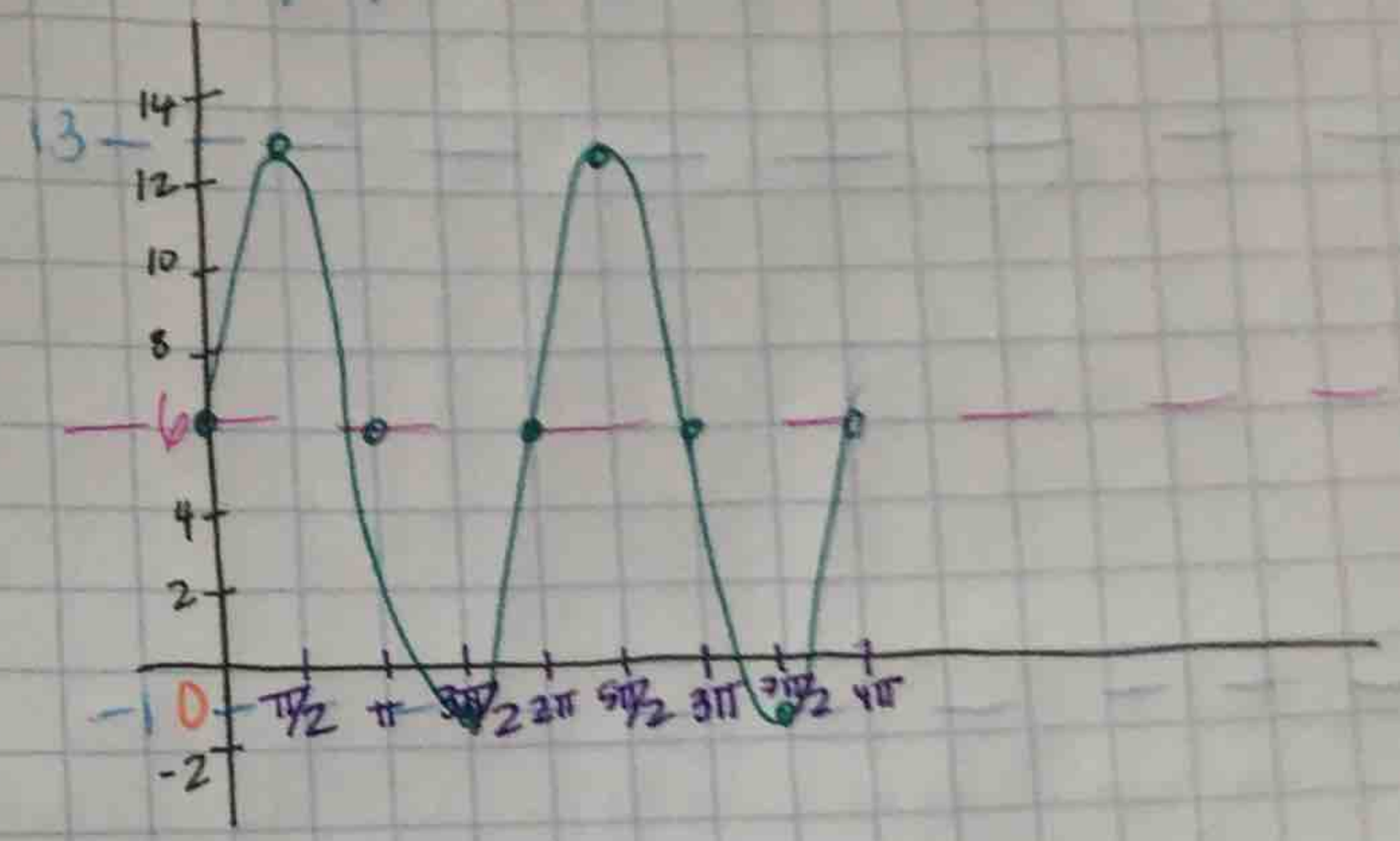
V.S.: 6 (up)

Amp: 7

B=1 Per = 2π

CP: $\pi/2$

H.S.(D) = 0



⑧ $y = -5\cos(x - 75°)$ (degrees) reflected cos → LOW

↑ reflection

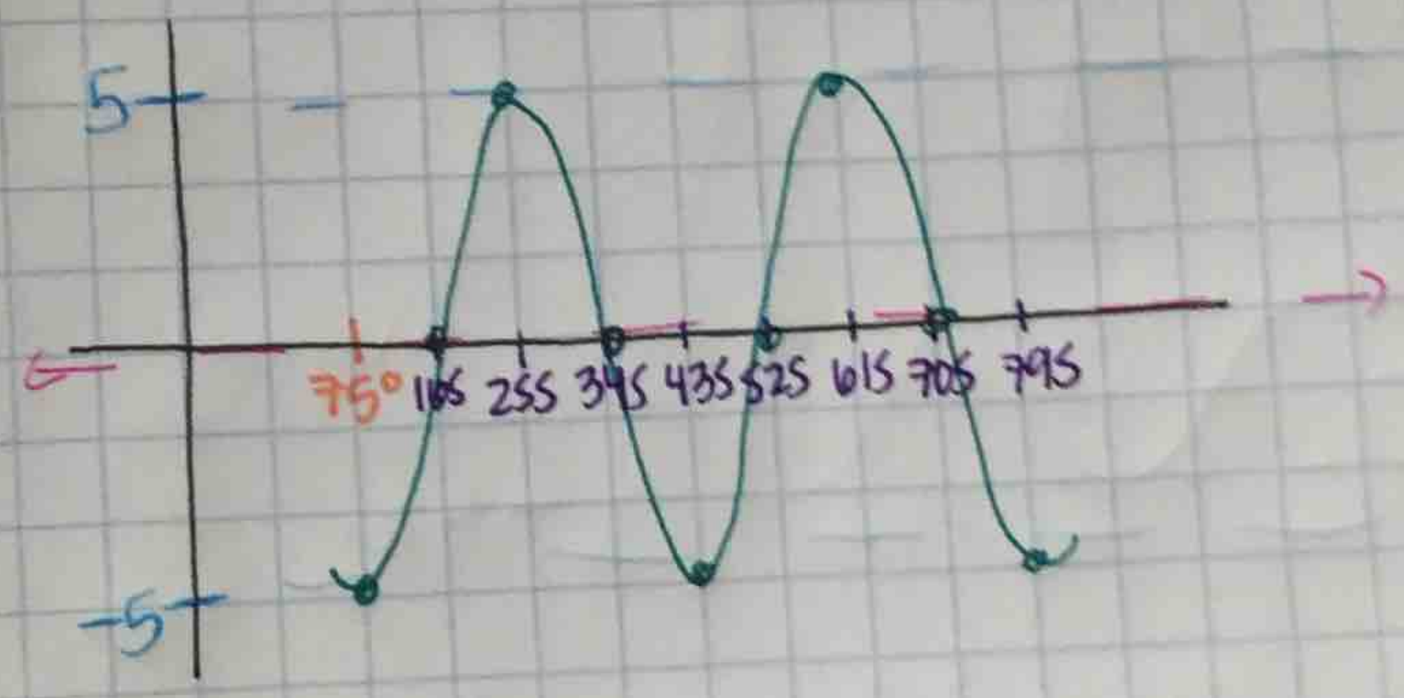
V.S. = 0

Amp: 5

B=1 Per = 360°

CP = 90°

H.S. = 75° (right)



⑨ $y = 1 - \cos\frac{\pi}{6}x$ (radians) reflected cos → LOW

↑ reflection

sinusoidal axis: 1

Amplitude: 1

$B = \frac{\pi}{6}$ period = $2\pi \div \frac{\pi}{6}$

$2\pi \cdot \frac{6}{\pi} = 12$

CP: $\frac{12}{4} = 3$

phase shift: 0