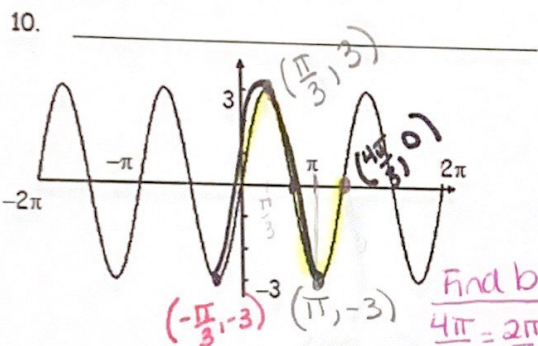**To write an equation from a graph:**
1. Find Amplitude
2. Identify the period from graph and then solve to find b
3. Find the vertical translation (sketch midline)
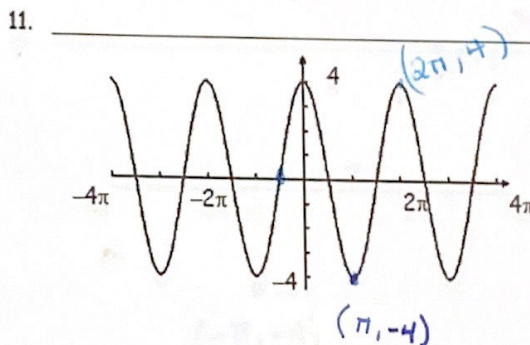4. Write a sine or cosine function depending on the phase shift.

Example 3: Write an equation (sine and cosine) for the graph.

10.

$(\frac{\pi}{3}, 3)$
$(-\frac{\pi}{3}, -3)$ $(\pi, -3)$

Find b
$\frac{4\pi}{3} = \frac{2\pi}{b}$

Amp: 3
Period: $\frac{4\pi}{3}$ $b = \frac{3}{2}$

VS: x   PS: x
Cos: PS: Right $\pi/3$

$y = 3\sin\frac{3}{2}\theta$

$y = -3\cos\frac{3}{2}(\theta + \frac{\pi}{3})$
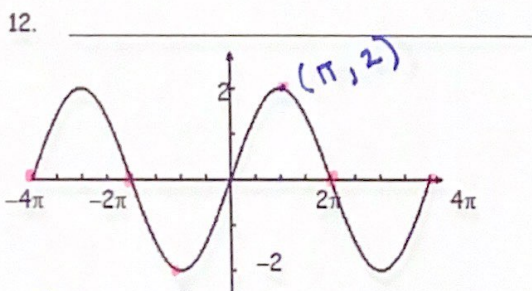
11.

$(2\pi, 4)$
$(\pi, -4)$

Amp: 4   Period: 2π VS: x
Sinθ
PS: left $\pi/2$ | Cosθ
                           PS: x

$y = 4\sin(\theta + \pi/2)$
$y = 4\cos\theta$

12.

$(\pi, 2)$
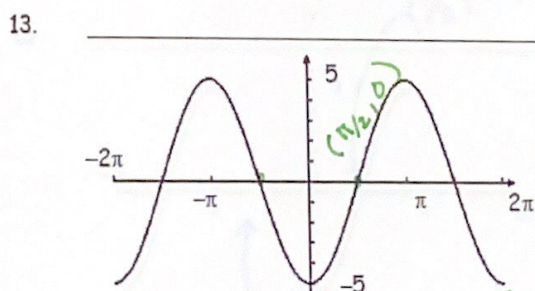
Amp: 2   Period 4π VS: x
∴ $b = \frac{1}{2}$

Sinθ PS: x   Cosθ PS: Right π

$y = 2\sin\frac{1}{2}\theta$
$y = 2\cos\frac{1}{2}(\theta - \pi)$
or $+3\pi$

13.

$(\pi/2, 0)$

Amp: 5   period: 2π VS: x
                b = 1
Sinθ PS: Right $\frac{\pi}{2}$ Cosθ PS: left 1

$y = 5\sin(\theta - \frac{\pi}{2})$
$y = 5\cos(\theta + \pi)$
or $y = 5\cos(\theta - \pi)$