Math 121 – Section 6.6 Solutions

3. $y = 4\sin(2x - \pi)$

$$\text{amplitude} = 4, \qquad \text{period} = \frac{2\pi}{2} = \pi, \qquad \text{phase shift} = \frac{\pi}{2}$$

7. $y = 3\sin(3x - \pi)$

$$\text{amplitude} = 3, \qquad \text{period} = \frac{2\pi}{3}, \qquad \text{phase shift} = \frac{\pi}{3}$$

11. $y = 3\cos(\pi x - 2) + 5$

$$\text{amplitude} = 3, \qquad \text{period} = \frac{2\pi}{\pi} = 2, \qquad \text{phase shift} = \frac{2}{\pi}$$

14. $y = -3\cos\left(2x + \frac{\pi}{2}\right)$

$$\text{amplitude} = 3, \qquad \text{period} = \frac{2\pi}{2} = \pi, \qquad \text{phase shift} = -\frac{\frac{\pi}{2}}{2} = -\frac{\pi}{4}$$

15. Since the amplitude is 2, let $A = 2$.
Since the period is π, we have:

$$\begin{aligned} \text{period} &= \frac{2\pi}{\omega} \\ \pi &= \frac{2\pi}{\omega} \\ \omega &= 2 \end{aligned}$$

Since the phase shift is $\frac{1}{2}$, we have:

$$\begin{aligned} \text{phase shift} &= \frac{\phi}{\omega} \\ \frac{1}{2} &= \frac{\phi}{2} \\ \phi &= 1 \end{aligned}$$

Therefore, $\boxed{y = 2\sin(2x - 1)}$.

17. Since the amplitude is 3, let $A = 3$.
Since the period is $\frac{\pi}{2}$, we have:

$$\begin{aligned} \text{period} &= \frac{2\pi}{\omega} \\ \frac{\pi}{2} &= \frac{2\pi}{\omega} \\ \omega &= 4 \end{aligned}$$

Since the phase shift is 2, we have:

$$\begin{aligned} \text{phase shift} &= \frac{\phi}{\omega} \\ 2 &= \frac{\phi}{4} \\ \phi &= 8 \end{aligned}$$

Therefore, $\boxed{y = 3\sin(4x - 8)}$.

18. Since the amplitude is 2, let $A = 2$.

Since the period is π, we have:

$$\begin{aligned} \text{period} &= \frac{2\pi}{\omega} \\ \pi &= \frac{2\pi}{\omega} \\ \omega &= 2 \end{aligned}$$

Since the phase shift is -2, we have:

$$\begin{aligned} \text{phase shift} &= \frac{\phi}{\omega} \\ -2 &= \frac{\phi}{2} \\ \phi &= -4 \end{aligned}$$

Therefore, $\boxed{y = 2\sin(2x + 4)}$.