2. [6 points] After escaping from a pirate ship and being stranded at sea for several days, mad scientist Kiki LeBlanc arrived at a desert island. On the island, the temperature is very predictable, and it can be modeled by a sinusoidal function which varies daily from a high of 90°F at 4pm to a low of 64°F at 4am. Find a formula for a sinusoidal function $T(h)$ that gives the temperature in °F on the island h hours after midnight on any given day.

$T(h) =$ $-13\cos\left(\frac{\pi}{12}(h-4)\right)+77$

Solution: The midline is $T = 77$, amplitude is 13, and period is 24 (horizontal scaling is $2\pi/24$). Since $T(h)$ at its low point 4 hours after $h = 0$ (midnight), we can use a "$-\cos$" graph shifted right 4.

3. [6 points] Kiki eats lots of papayas and coconuts on the island when she's hungry. When she eats w pounds of papayas, she stays full for $P(w)$ hours. When she eats w pounds of coconuts, she stays full for $C(w)$ hours. Give practical interpretations of the following expressions:

- $C^{-1}(3) = 2$.

Solution: This means: Kiki stays full for 3 hours when she eats 2 pounds of coconuts.

- $P^{-1}(C(4))$

Solution: $P^{-1}(C(4))$ is the weight of papayas Kiki needs to eat to stay full as long as if she ate 4 pounds of coconut.

