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.

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

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.