3. [13 points] Jada remembers from her time in Dreamland that the temperature was very consistent every day: It would increase from a low of 45° Fahrenheit at 2 am to a high of 75° Fahrenheit at 2 pm. The temperature, in degrees Fahrenheit, \( h \) hours after midnight could be modeled by a sinusoidal function \( T(h) \). Dreamland days are 24 hours.

\[ \text{a. [4 points] On the axes below, sketch a graph of } y = T(h), \text{ showing at least one full period. Clearly label the axes and important points on your graph. Be very careful with the shape and key features of your graph.} \]

\[ \text{b. [5 points] Find a sinusoidal formula for } T(h). \text{ You do not need to show work.} \]

**Answer:** \( T(h) = \)

\[ \text{c. [4 points] Jada’s elf friend, Alf, ran an apple stand, and found that the length of the line for his stand, in meters, could be modeled by an invertible function } g(F), \text{ where } F \text{ is the current temperature in degrees Fahrenheit. Interpret the meaning of the following mathematical expressions or equations, or explain why they don’t make sense in the context of the problem.} \]

\[ (i) \quad g^{-1}(20) \]

\[ (ii) \quad g(T(14)) = 8. \]