

5. [9 points]

- a. [4 points] Each year, a lake reaches its maximum temperature of 76 degrees Fahrenheit ($^{\circ}\text{F}$) on September 1, and its minimum temperature of 40°F on March 1. Write a formula for a sinusoidal function $T(m)$ modeling the lake's temperature, in $^{\circ}\text{F}$, m months after January 1.

Answer: $T(m) =$ _____

- b. [5 points] The depth $D(m)$ of this lake, in feet, can also be represented by a sinusoidal function, namely

$$D(m) = 985 + 20 \sin\left(\frac{\pi}{6}m\right),$$

where m is the time in months after January 1. Find the amount of time, in months, each year when the depth of the lake is at least 1000 feet. Give your answer in **exact form**.

Answer: _____