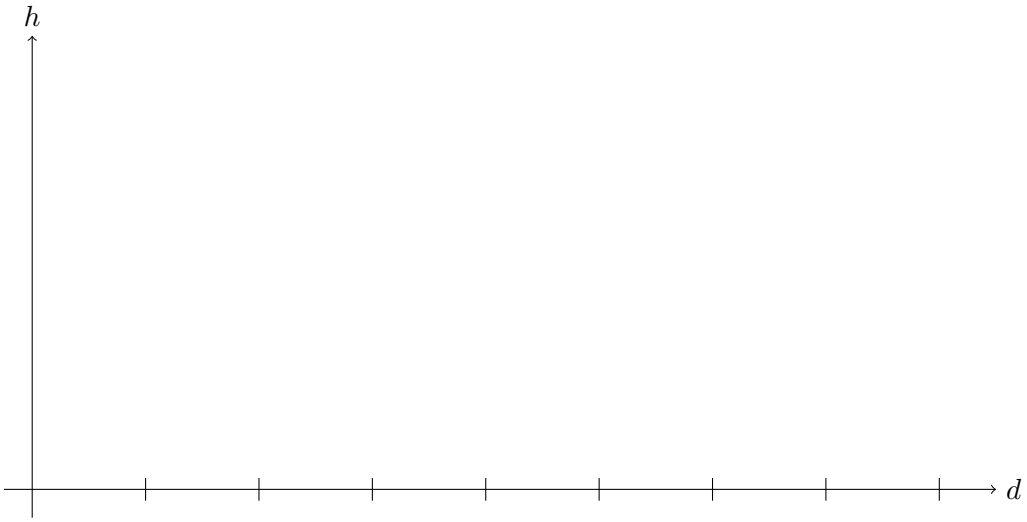
6. [14 points] On the planet of Sinosia, the number of hours of direct sunlight at a particular location varies sinusoidally throughout the year (which is not the same length as a year on Earth). In particular, the number of hours of daylight on the dth day is given by

$$S(d) = 8 + 3\sin\left(\frac{\pi}{200}d\right).$$

a. [4 points] On the axes below, sketch a graph of **two periods** of $h = S(d)$. Your second cycle should end at the d-value indicated by the tick mark furthest to the right. Clearly label at least two of the tick marks on the d-axis. On the h-axis, add and label at least two tick marks to indicate the maximum and minimum values of $S(d)$.



b. [5 points] Find the first 3 positive d values for which there is 10 hours of direct sunlight. *Show your work and give answers in exact form or rounded to the nearest day.*

Answer: $d =$ _____, _____, _____

(Problem continues on the next page.)

This page may be used for scrap work.
Clearly indicate if any work on this page should be graded.