## Lynx in the Yukon

The Hudson's Bay Company collected data on the number of lynx pelts brought in by trappers between 1821 and 1934. This set of data gives us valuable information about lynx populations over many years in northern Canada. The number of lynx varies periodically, with peaks every 8 to 11 years.

For this worksheet, let's say that the number of lynx trapped during a peak year is approximately $3,000,000$, and the number trapped during a low year is 80,000 . Assume 1821 was a low year and 1826 was a peak year. We will construct a sinusoidal function to model the number of lynx trapped each year, a proxy for population.

1. What is the amplitude of this periodic function?
2. What is the period of the function? Use the assumptions stated at the beginning of the worksheet.
3. Construct an equation for the number of lynx trapped per year, $L(t)$, using your period and amplitude. (Are you going to start with $t=0$ or $t=1821$ ? Why?)

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4. Graph your equation below. For these axes I chose to start with $t=0$ in the year 1821.

5. How does your model fit with the actual data? Plot the actual numbers for every tenth year (1821, 1831, etc.) on your graph above. Compare the following:
(a) the period:
(b) the amplitude:
(c) the shape:
6. If you were an ecologist studying arctic populations, would you evaluate your sinusoidal model as good enough or not?
