2. [15 points] Lake Huron and Lake Erie are two of the Great
Lakes, as shown to the right. The volume of Lake Huron
is very approximately 4,000 km^3, and that of Lake Erie ap-
proximately 500 km^3. We assume that the flow into and out
of both lakes is the same, approximately 200 km^3/year, and
that all water that flows out of Lake Huron flows into Lake
Erie. Suppose that a ruptured oil line adds 30×10^9 kg/year
of oil into Lake Huron.

a. [5 points] Write a system of equations for x_1, the amount of oil in Lake Huron, and x_2,
the amount in Lake Erie. Assume that the oil is well mixed in either lake, and that the
water entering Lake Huron is clean.

b. [5 points] Solve your equation for x_1 directly and use that to solve for x_2. It will likely
be convenient to write your answer in terms of the constant $r = 3 \times 10^{10}$.

c. [5 points] Using your work in (a) and (b), write your system from (a) as a matrix equation,
and write the solution as a vector $\mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$. What are the eigenvectors of the coefficient
matrix in your system?