1. Suppose that you are managing n items and they are sorted so that the optimal reorder intervals satisfy $T_1^* < T_2^* < \ldots < T_n^*$.

   a) As a manager you want to simplify your life and use a single reorder interval, say a, for all the items in the set. If you use a common order interval $a \in (T_1^*, T_n^*)$ then the relative error for item i is $e(a/T_i^*)$ where as usual $e(x) = \frac{1}{2}(x + 1/x)$. Notice that the largest relative error will be incurred by either item 1 or item n. To minimize the maximum, solve $e(a/T_1^*) = e(a/T_n^*)$ for a. Is a the average of T_1 and T_2? If not, is it below or above the average? Evaluate $e(a/T_1)$.

   b) If the result of part a) turns out to be large, you may want to partition the set of items into two subsets and then use a common reorder interval for each subset. More precisely, you want to partition the items into two sets $\{1, \ldots, m\}$ and $\{m+1, \ldots, n\}$ for some $1 \leq m < n$ and then find reorder intervals a and b such that $0 < a < b$ so that $T_1 = \ldots = T_m = a$ and $T_{m+1} = \ldots = T_n = b$. The idea is to find the constants a and b and a choice of the integer m to minimize the maximum cost penalty of using this restriction. Try your method on the following data:

$$T_1^* = 0.25, \ldots, T_n^* = 1.$$

2. Consider the five item ELSP with data

item	μ_i	λ_i	h_i	s_i(days)	K_i
1	10,000	900	2	1	250
2	5,000	1,000	1	5	250
3	6,000	1,000	5	10	50
4	4,000	500	3	2	100
5	7,500	1,500	4	5	500

   (a) Assume a 360 day year and use this information to compute a lower bound on the long run average ordering and holding cost.

   (b) Find an optimal rotation schedule.

   (c) What is the cost penalty of using the rotation schedule relative to the cost lower bound?