"Dynamic" Simulation Example: Inventory

You sell a product for which monthly demand is Poisson with a mean of 400. The units cost you $1,500 each and you sell them for $2,800. You can carry inventory from month-to-month, and estimate your inventory holding cost as $10 per unit left in inventory at the end of a month.

Every time you order, there is a fixed cost of $600, plus the $1,500 per unit cost of the products ordered.

You want to simulate a 24-month period, at the outset of which you have 700 units in stock. For every unit in stock at the end of this period, you assess a "salvage" credit of $1,500.

You are considering ordering policies of the following form: if the ending inventory for a given month is less than or equal to some "threshold" value *R*, immediately order another *Q* units. For simplicity, assume that these units become available immediately at the beginning of the next month.

Your boss asks you to evaluate the following possible combinations of *R* and *Q*. Which one seems to yield the highest expected profit over the 24-month period?

Policy	*R*	*Q*
1	400	800
2	400	1,000
3	400	1,200
4	500	1,000
5	500	1,200
6	600	1,000
7	600	1,200

For each policy, you also wish to estimate the probability of having a "stockout" at some time during the 24-month period. A "stockout" means that there is insufficient stock to meet customer demand.