1... Given the following data:

\[ K = 350 \quad h = 0.3/\text{yr} \quad p = 9 \quad D = 25500/\text{yr}. \]

(a) Determine the optimal economic order quantity (EOQ).
(b) Determine a range of values for \( D \) such that the total annual cost will be within 5% of optimal if the EOQ of part (a) continues to be used.
(c) Determine how much of a special purchase should be made, if any, if the price is about to increase by 50%.

2... Neighborhood Hardware acts as a central buying agent for a large number of retail hardware outlets in the Midwest. The product line is divided into 6 major categories, with a different buyer responsible for each single category. One category is home outdoor equipment. The buyer for this group seeks assistance with regard to the acquisition of a particular type of small snowblower that must be ordered several months before the winter. Certain data is available:

- Unit acquisition cost is $60.
- Selling price is $100/unit.
- Any units unsold at the end of the winter are marked down to $51 which assures that they will be sold.
- Forecasted demand for the coming winter season:

<table>
<thead>
<tr>
<th>Hundreds of units, ( k )</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{Prob}(k) )</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

(a) To maximize profits, how many units should the buyer acquire?
(b) What is the expected profit?

3... Inventory control system parameters are to be established using the following data:

\[ K = 200 \quad h = 2/\text{unit-week} \quad L = 3 \text{ weeks} \quad R = 4 \text{ weeks} \]
\[ \text{E}(D) = 550/\text{week} \quad \sigma(D) = 300 \quad (\text{weekly demand is Normally distributed}) \]
Demand not met directly from inventory is lost to a competitor.

(a) Given that \( SLM_1 = 0.99 \), determine an optimal safety stock and order-up-to-level for the control system.
(b) Assume \( R = 0 \) and the corresponding reorder point is 4000. Determine an order quantity such that \( SLM_1 = \text{Prob}\{\text{system has insufficient inventory in any given cycle}\} \).

Note: \( SLM_1 \) not necessarily .99!!