7004 A3
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1.

(a)

$D = 25,750$, $S = 250$, $H = 10 \times 33\% = 3.3$

$Q = \sqrt{\frac{2SD}{H}} = 1975$. $ROP = D \cdot LT = 515$

(b).

$AOC = \frac{D \cdot S}{Q} = 3259$, $AHC = \frac{Q \cdot H}{2} = 3259$

2.

(a)

$Z = NORMSINV(0.95) = 1.645$. $\sigma_{LT} = \sigma \cdot \sqrt{T} = 25$

$SS = Z \cdot \sigma_{LT} = 41$. $ROP' = ROP + SS = 556$

(b).

$AOC = \frac{D \cdot S}{Q} = 3259$, $AHC = (\frac{Q}{2} + SS) \cdot H = 3394$

3.

(a).

$f(Q) = \frac{Q}{2}H + \frac{D}{Q} \cdot S$. $f'(Q) = \frac{1}{2}H - \frac{DS}{Q^2}$

$f'(Q) = 0 \Rightarrow Q = \sqrt{\frac{2DS}{H}} \Rightarrow f(Q)$ is minimized at $EOQ = \sqrt{\frac{2SD}{H}}$

(b). $Q = \sqrt{\frac{2SD}{H}}$.

$AOC = \frac{D \cdot S}{Q} = \frac{\sqrt{2HSD}}{2}$, $AHC = \frac{Q \cdot H}{2} = \frac{\sqrt{2HSD}}{2}$

$\therefore AHC = AOC$

4.

(a). $D = 60 \times 52 = 3120$, $S = 12$. $H = 0.02 \times 0.25 = 0.005$

$Q = \sqrt{\dfrac{2SD}{H}} = 3870$, $time = \dfrac{Q}{D} = 1.24$

(b).

$$YHC = \frac{Q \cdot H}{2} = 9.68 \quad , \quad YSC = \frac{D \cdot S}{Q} = 9.67$$

5.

(a). $SC = \dfrac{52 \cdot 120}{Q} \cdot S = 19.24$, $total\ cost = 19.24 + 9.67 = 28.91$

(b).

$D' = 120 \cdot 52 = 6240$, $Q' = \sqrt{\dfrac{2SD'}{H}} = 5473$

$HC = \dfrac{Q' \cdot H}{2} = 13.68$, $SC = \dfrac{D' \cdot S}{Q'} = 13.68$

$Total\ cost = HC + SC = 27.36$

(c). $percentage = \dfrac{|27.36 - 28.91|}{27.36} = 5.88\%$

EOQ model is not sensitive to errors in the data.

6.

$Z = \text{NORMSINV}(0.98) = 2.05$. $\sigma_{LT+T} = \sqrt{4} \times 90 = 180$

mean demand $= 4 \times 300 = 1200$

new order $= 1200 + Z \cdot \sigma_{LT+T} = 1569$

$SS = 0.5 \cdot Z \cdot \sigma_{LT+T} = 185$

$\frac{185}{180} = 1.02 = Z' \implies 84.7\%$

7.

(a).

$Z = \text{NORMSINV}(0.95) = 1.645$. $\sigma = 2000 \cdot \sqrt{T} = 2000$

$SS = Z \cdot \sigma = 3290$

$D = 10000 \times 50 = 500000$, $S = 1000$, $H = 10 \times 25\% = 2.5$

$Q = \sqrt{\frac{2SD}{H}} = 20000$, single warehouse $= \frac{Q}{2} + SS = 13290$

average inventory $= 4 \cdot$ single warehouse $= 53160$

$ASC = \frac{D \cdot S}{Q} = 25000$. $AHC = (\frac{Q}{2} + SS) \cdot H = 33225$

Total cost $= ASC + AHC = 58225$

time $= \frac{\frac{Q}{2} + SS}{D} \cdot 50 = 1.33$ weeks

(b)

$6' = 2000 \cdot \sqrt{4} = 4000$, $D' = 4D = 2000000$

$Q' = \sqrt{\dfrac{2SD'}{H}} = 40000$, $SS' = 6' \cdot Z = 6580$

average inventory$' = \dfrac{Q'}{2} + SS' = 26580$

$ASC' = \dfrac{D' \cdot S}{Q'} = 50000$, $AHC' = \left(\dfrac{Q'}{2} + SS'\right) \cdot H = 66450$

Total cost$' = ASC' + AHC' = 116450$

time$' = \dfrac{\frac{Q'}{2} + SS'}{D'} \cdot 50 = 0.665$ weeks