Bus 351: Intro to Operations Management
Section 002
November 15, 2012

Assessment 7_In-Class
Total Points: 15

Assessment 7 - KEY

Student Name:

1. (6 points) The Warren W. Fisher Computer Corporation purchases 8,000 transistors (D) each year as components in minicomputers. The unit cost of each transistor is $10, and the cost of carrying (H) one transistor in inventory for a year is $3. Ordering cost (S) is $30 per order (C).

* Carrying cost = holding cost

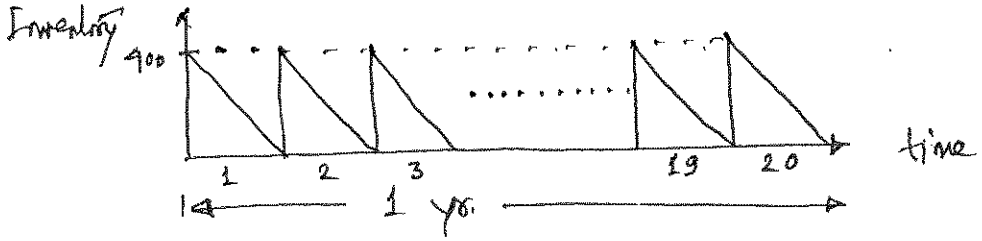
Calculate:

a. (2 points) the optimal order quantity

$$Q^* = \sqrt{\frac{2SD}{H}} = \sqrt{\frac{2(30)(8000)}{3}} = \sqrt{160{,}000} = 400 \text{ units.}$$

b. (2 points) the expected number of orders placed each year

$$\text{Orders per year} = \frac{D}{Q^*} = \frac{8000}{400} = 20$$



c. (2 points) the expected time between orders (Assume that Fisher operates on a 200-day working year)

Since the demand is constant, and inventory decreases at a constant rate, lead time is also constant for each cycle. Therefore, the time of each cycle is equal to the time between orders.

20 orders for 200 days => each order cycle is worth 200/20 = 10 days.

∴ time between orders = 10 days.

2. (9 points) The average daily demand for Apple iPods at a Circuit City store is 15, with a standard deviation of demand during lead time at 7 units. Lead time = 2 days.

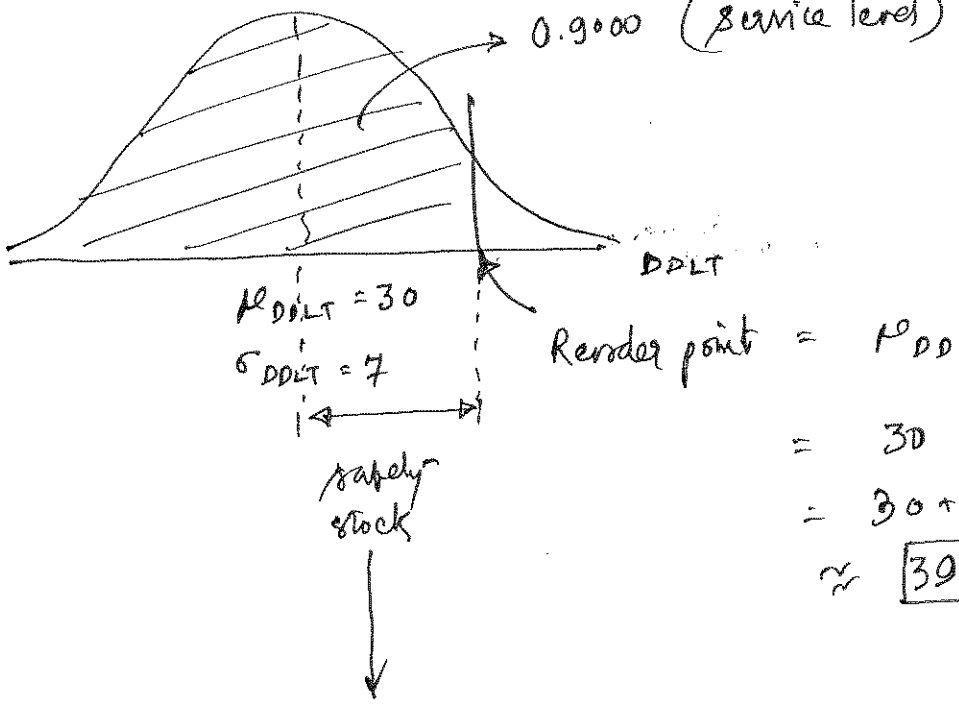
   a. (3 points) Find the reorder point if management wants a 90% service level (i.e. risks stock-outs only 10% of the time). Please show your work and DRAW THE DISTRIBUTION.

Average daily demand = 15

Lead time = 2 days

∴ Average demand during lead time $(\mu_{DDLT}) = 15 \times 2 = 30$

$\sigma_{DDLT} = 7$



Reorder point = $\mu_{DDLT} + Z \cdot \sigma_{DDLT}$

$= 30 + (1.28)(7)$

$= 30 + 8.96 = 38.96$

$\approx \boxed{39}$

   b. (1 point) How much of this is safety stock?

Safety stock = $39 - 30 = 9$ units.

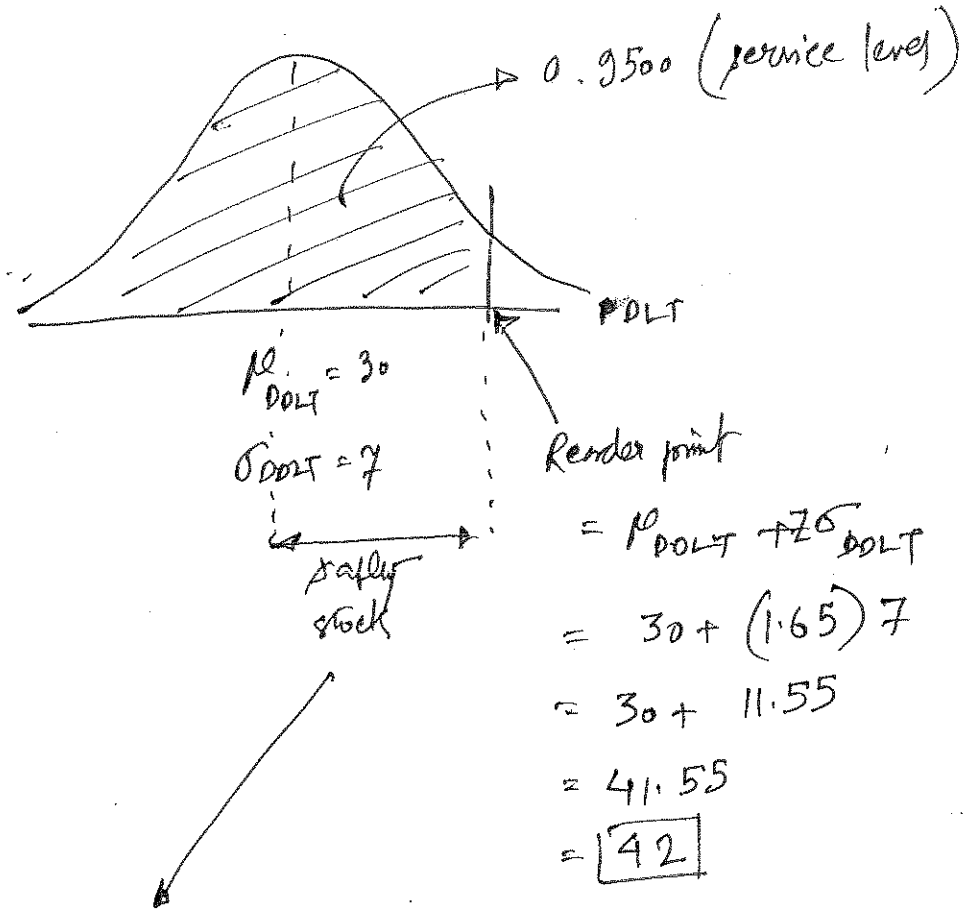
Alternatively, safety stock = $Z \cdot \sigma_{DDLT}$

$= 1.28 \times 7 = 8.96 \approx 9$ units.

c. (3 points) Find the reorder point if management wants a 95% service level (i.e. risks stock-outs only 5% of the time). Please show your work and DRAW THE DISTRIBUTION.

$\mu_{DDLT} = 30$

$\sigma_{DDLT} = 7$



d. (1 point) How much of this is safety stock?

$42 - 30 = \boxed{12 \text{ units}}$.

e. (1 point) If the standard deviation in demand is 4 units per day, and the lead time is constant at 2 days, what is the standard deviation of DDLT?

$\sigma_{daily} = 4 \Rightarrow \sigma^2_{daily} = 16$

lead time = 2 days.

$\therefore \sigma_{DDLT} = \sqrt{\sigma^2_{daily\ demand} \times \text{lead time}}$

$= \sqrt{16 \times 2} = \sqrt{32} = \boxed{5.66}$