Mgt 125 SOM   Solution to Practice Exam   Prof SU

Name: ___________________

1. X: the quantity rationed to high-service channel:
   Cu: if the manufacturer under-estimates high-service channel demand and rations too little to this channel, it loses the opportunity to get a higher margin. Cu is the margin difference (6-4) = 2.
   Co: if the manufacturer over-estimates high-service channel demand and rations too much to this channel, there will be leftovers in the high-service channel which would have been sold in the discount channel. In other words, the manufacturer loses the opportunity to sell the product at the discount channel, hence Co = 4. Therefore, Critical Fractile= Cu/(Cu+ Co)=1/3, z=-0.4

   The optimal quantity rationed to high-service channel is μ+z*б=40,000-0.43(15000)=33,550. or use Norm.inv(1/3,40000,15000)=33,539

2.

# of No-Shows (d)	**Probability**	**P(d<X)**
0	0.1	0
1	0.25	0.1
2	0.2	0.35
3	0.35	0.55
4	0.1	0.9

X: # of seats overbooked
Cu = $180, Co = $150, Critical Fractile = 0.5455.
Use the optimality condition, we get $Q^* = 2.$ So the optimal overbooking level is 2, hence 102 reservations should the airline accept.

3. (a) $P_0 = 1 - \frac{\lambda}{\mu} = 1 - \frac{20}{30} = 0.33 \Rightarrow 33\%$

   (b) $p = \frac{\lambda}{\mu} = 0.66$

   (c) $L_s = \lambda/(\mu - \lambda) = 20/(30-20) = 2$ people

   (d) $L_q = \frac{\lambda^2}{\mu(\mu-\lambda)} = \frac{20^2}{30(30-20)} = 1.33$ people

   (e) $W_s = 1/(\mu - \lambda) = 1/(30-20) = 0.10$ hours

   (f) $W_q = \frac{\lambda}{\mu(\mu-\lambda)} = \frac{20}{30(30-20)} = 0.0667$ hours