DaiPark-chapter1

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Exercise 9

(a)

C_o=(Wholesale cost + Salvage Price)=(480+25)=$505

C_u=(retail price + special delivery charge)=(600+50)=$650

Expected Economic Cost = E[Manufacturing Cost] + E[Cost associated with understock Risk]

+ E[Cost associated with overstock Risk]

$$= C_v \cdot E[X] + C_u \cdot E[(D-X)^+] + C_o \cdot E[(X-D)^+]$$

$$= 480 * E[X] + 650 * E[(D-X)^+] + 505 * E[(X-D)^+]$$

(b)

$F(y) \geq \frac{650}{650+505}$ $F(y) \geq 0.56277056$

d	10	11	12	13	14	15
$P(D=d)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

$F_D(10) = \frac{1}{6} < 0.56277056$

$F_D(11) = \frac{1}{6} + \frac{1}{6} = \frac{1}{3} < 0.56277056$

$F_D(12) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{1}{2} < 0.56277056$

$F_D(13) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{2}{3} \geq 0.56277056$

Thus, y^*=13

(c)

N = (1000,100)

Z = (Q- μ)/ σ

$\rightarrow \therefore Best\ order\ quantity\ = Q = \mu + Z * \sigma$ = 1,000+0.56*100 = 1,056

Exercise 10

(a)

Regardless of inventory, the unit cost is the same.

C_o=(solvent costs + disposal charge)=(40+10)=\$50

C_u=(seriously disrupted at a cost)=\$100

$$F(y) \geq \frac{100}{100+50}$$

$$F(y) \geq \frac{2}{3}$$

d	500	600	700	800
$P(D=d)$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$

(when m=0)

$F_D(500) = \frac{1}{8} < 0.6667$

$F_D(600) = \frac{1}{8} + \frac{1}{2} = \frac{5}{8} < 0.6667$

$F_D(700) = \frac{1}{8} + \frac{1}{2} + \frac{1}{4} = \frac{7}{8} \geq 0.6667$

Thus, y^*=700

(b)

It is the best order quantity obtained by considering the inventory, minus the inventory amount, which has the lowest value.

(c)