

Homework #6: Solutions

A)

$$C_O = \$5 - \$1 = \$4$$

$$C_U = \$12 - \$5 = \$7$$

$$\text{Critical ratio} = C_U / (C_O + C_U) = 7/11 = 0.6363\overline{63}$$

Hence we should purchase enough to satisfy the demand with a probability of $0.6363\overline{63}$. The Optimal Q^* is the 63.63 percentile of the demand distribution.

$$\text{Standardized value } z = 0.35$$

$$\text{Hence } Q^* = 20 * 0.35 + 100$$

$$\mathbf{Q^* = 107}$$

B)

$$C_O = \$5 - \$1 = \$4$$

$$C_U = \$8 - \$5 = \$3$$

$$\text{Critical ratio} = C_U / (C_O + C_U) = 3/11 = 0.4286$$

Hence we should purchase enough to satisfy the demand with a probability of 0.4286 . The Optimal Q^* is the 42.86 percentile of the demand distribution.

$$\text{Standardized value } z = -0.18$$

$$\text{Hence } Q^* = -20 * 0.18 + 100 = 96.4$$

$$\mathbf{Q^* = 96}$$

C)

$$C_O = \$5 - \$1 = \$4$$

$$C_U = \$12 - \$5 = \$7$$

$$\text{Critical ratio} = C_U / (C_O + C_U) = 7/11 = 0.6363\overline{63}$$

Hence we should purchase enough to satisfy the demand with a probability of $0.6363\overline{63}$. The Optimal Q^* is the 63.63 percentile of the demand distribution.

$$Q^* = 70 + (0.6363\overline{63} * (130 - 70)) = 108.18$$

$$\mathbf{Q^* = 108}$$

D)

$$C_O = \$5 - \$1 = \$4$$

$$C_U = \$12 - \$5 = \$7$$

$$\text{Critical ratio} = C_U / (C_O + C_U) = 7/11 = 0.6363\bar{63}$$

Hence we should purchase enough to satisfy the demand with a probability of $0.6363\bar{63}$. The Optimal Q^* is the 63.63 percentile of the demand distribution.

Q	f(Q)	F(Q)
80	0.05	0.05
85	0.08	0.13
90	0.11	0.24
95	0.17	0.41
100	0.2	0.61
105	0.15	0.76
110	0.1	0.86
115	0.08	0.94
120	0.06	1

0.6363

$$Q^* = 100$$