Q1. Cannot say

Q2.

$$P(B) = 1 - P(A) = 0.6$$

Q3.

$$\begin{aligned} P(C) &= P(C|A)P(A) + P(C|A')P(A') \\ &= P(C|A)P(A) + P(C|B)P(B) \\ &= P(C|A)P(A) + (1 - P(D|B))P(B) \\ &= 0.2 \times 0.4 + (1 - 0.4) \times 0.6 \\ &= 0.44 \\ P(D) &= 1 - P(C) \\ &= 0.56 \end{aligned}$$

Q4.

$$\begin{aligned} Y &= 2nd\ customer\ bought\ after\ lowering\ price\ to\ \$0.5 \\ H,\ M,\ L &= wtp\ distributions \end{aligned}$$

$$Prior\ (After\ 1st\ customer\ left)$$

$$P(H) = \frac{1}{4}\ ;P(M) = \frac{1}{3}\ ;P(L) = \frac{5}{12}$$

$$\begin{aligned} P(H|Y) &= \frac{P(Y|H)P(H)}{P(Y)} \\ &= \frac{P(Y|H)P(H)}{P(Y|H)P(H) + P(Y|M)P(M) + P(Y|L)P(L)} \\ &= \frac{\frac{5}{6} \times \frac{1}{4}}{\frac{5}{6} \times \frac{1}{4} + \frac{2}{3} \times \frac{1}{3} + \frac{1}{2} \times \frac{5}{12}} = \frac{15}{46} \end{aligned}$$

$$\begin{aligned} P(M|Y) &= \frac{P(Y|M)P(M)}{P(Y)} \\ &= \frac{P(Y|M)P(M)}{P(Y|H)P(H) + P(Y|M)P(M) + P(Y|L)P(L)} \\ &= \frac{\frac{2}{3} \times \frac{1}{3}}{\frac{5}{6} \times \frac{1}{4} + \frac{2}{3} \times \frac{1}{3} + \frac{1}{2} \times \frac{5}{12}} = \frac{8}{23} \end{aligned}$$

$$P(L|Y) = 1 - P(H|Y) - P(M|Y) \ = \frac{15}{46}$$

$$Expected\ value\ @\$1.0 = \frac{15}{46} \times \frac{1}{2} + \frac{8}{23} \times \frac{1}{3} + \frac{15}{46} \times \frac{1}{6} = \frac{1}{3}$$

$$Expected\ value\ @\$0.5 = 0.5 \times \left[\frac{15}{46} \times \frac{5}{6} + \frac{8}{23} \times \frac{2}{3} + \frac{15}{46} \times \frac{1}{2}\right] = \frac{1}{3}$$