Statistics 31, Section 3, Solution to HW 4.85

4.85, ignore "Venn diagram", as intermediate steps, find:

(a,i) P{Coffee and not Tea and Cola} (0.20)

P{Coffee and Cola} = P{Coffee and Tea and Cola} + P{Coffee and not Tea and Cola},
So P{Coffee and not Tea and Cola} = P{Coffee and Cola} - P{Coffee and Tea and Cola}
= 0.25 – 0.05 = 0.20.

(a,ii) P{Coffee and Tea and not Cola} (0.10)

P{Coffee and Tea} = P{Coffee and Tea and Cola} + P{Coffee and Tea and not Cola},
So P{Coffee and Tea and not Cola} = P{Coffee and Tea} - P{Coffee and Tea and Cola}
= 0.15 – 0.05 = 0.10.

(a,iii) P{Tea and not Cola} (0.15)

P{Tea and not Cola} = P{Coffee and Tea and not Cola} + P{not Coffee and Tea and not Cola},
= 0.10 + 0.05 = 0.15.

(a,iv) P{Tea and Cola} (0.10)

P{Tea} = P{Tea and Cola} + P{Tea and not Cola},
So P{Tea and Cola} = P{Tea} - P{Tea and not Cola} = 0.25 – 0.15 = 0.10

(a,v) P{not Coffee and Tea and Cola} (0.05)

P{ Tea and Cola} = P{Coffee and Tea and Cola} + P{not Coffee and Tea and Cola},
So P{not Coffee and Tea and Cola} = P{Tea and Cola} - P{Coffee and Tea and Cola} =
= 0.10 – 0.05 = 0.05

(a,vi) P{not Coffee and not Tea and Cola} (0.15)

P{Cola} = P{not Coffee and not Tea and Cola} + P{Coffee and Cola} + P{not Coffee and Tea and Cola},
So P{not Coffee and not Tea and Cola} = P{Cola} - P{Coffee and Cola} - P{not Coffee and Tea and Cola} = 0.45 – 0.25 – 0.05 = 0.15

(b,i) P{Coffee or Tea} (0.65)

= P{Coffee} + P{Tea} - P{Coffee and Tea} = 0.55 + 0.25 – 0.15 = 0.65.

(b,ii) P{(Coffee or Tea) or(not Coffee and not Tea and Cola)} (0.80)

= P{Coffee or Tea} + P{not Coffee and not Tea and Cola} – 0 (since mutually exclusive),
= 0.65 + 0.15 = 0.80

(b,iii) P{Coffee or Tea or Cola} (0.80)

= P{(Coffee or Tea) or(not Coffee and not Tea and Cola)} = 0.80

(b,iv) P{not (Coffee or Tea or Cola)} (0.20)

= 1 - P{Coffee or Tea or Cola} = 1 – 0.20 = 0.80