Q3.4.1 :

Let M: Men, W: Women, A_1: No Victimization, A_2: Partners, A_3:Nonpartners, A_4: Multiple Victimization.

a) $P(Women) = P(w) = \frac{679}{1024} = 0.663$
b) Marginal Probability.
c) 1. $P(W) = P(W \cap A_1) + P(W \cap A_2) + P(W \cap A_3) + P(W \cap A_4) = \frac{611}{1024} + \frac{34}{1024} + \frac{16}{1024} + \frac{18}{1024}$
   2. $P(W) = 1 - P(M) = 1 - \frac{345}{1024}$
d) $P(W \cap A_2) = \frac{34}{1024}$
e) Joint probability
f) $P(A_3|M) = \frac{17}{345}$
g) $Conditional\ probability$
h) $P(M \cup A_2) = P(M) + P(A_2) - P(M \cap A_2) = \frac{345+44-10}{1024}$
i) $Additional\ rule$

Q3.4.3:

a) $P(M \cap S) = \frac{220}{1021} = 0.3418$
b) $P(M \cup S) = P(M) + P(S) - P(M \cap S) = \frac{673+569-349}{1021} = 0.8746$
c) $P(M|S) = \frac{349}{569} = 0.6134$
d) $P(M) = \frac{673}{1021} = 0.6592$

Q3.4.4:

a) $P(Asian, Pacific - Island \text{ physician}) = \frac{417}{2720} = 0.1533$
b) $P(African \text{ physician}|African \text{ Patient}) = \frac{162}{745} = 0.2174$
c) $P(\text{Asian} - \text{American Patient} \cap \text{ Asian, Pacific} - \text{Islander physician}) = \frac{203}{2720} = 0.0746$
d) $P(\text{Hispanic Patient} \cup \text{Hispanic physician}) = \text{P(Hispanic Patient)} + \text{P(Hispanic physician)} - \text{P(Hispanic Patient} \cap \text{Hispanic physician)} = \frac{676+166-128}{2720} = 0.2625$
e) $P(\text{not have a white physician}) = \text{P(white physician)}^c = 1 - \text{P(white physician)} = 1 - \frac{1796}{2720} = 0.3397$

Q3.4.5:

$P(L) = 0.5 \implies P(R) = P(L^c) = 1 - P(L) = 0.5$

Q3.4.6:

$P(M) = 0.6, P(M \cap S) = 0.2$

Then,

$$P(S|M) = \frac{0.2}{0.6} = 0.33$$

Q3.4.7:

$P(H) = 0.35, P(S|H) = 0.86$

Then,

$P(S \cap H) = P(S|H)P(H) = 0.35 * 0.86 = 0.301$