Probability I - Classwork

Question 1: Events A and B are contained within a sample space S. Given that $P(A) = 0.5$, $P(B) = 0.3$, and $P(A \cap B) = 0.1$, find:

(a) $P(A \cup B)$

(b) $P(A \cap B^C)$

(c) $P[(A \cap B^C) \cup (B \cap A^C)]$

Question 2: Let $P(A) = 0.45$, $P(B) = 0.22$, and $P(C) = 0.31$,

(a) If A, B, C, and D are disjoint (mutually exclusive) and collectively exhaustive events, what is $P(D)$?

(b) If A, B, C, and D are disjoint and collectively exhaustive events what is $P(A \cup B)$?

(c) If A, B, C, and D are disjoint and collectively exhaustive events what is $P(A \cap B)$?

(d) If B and C are independent, what is $P(B \cap C)$?

(e) If $P(A \cap B) = 0.3$, what is $P(A \cup B)$?

(f) Find $P(E)$ if $P(A \cup E) = .6$, and A and E are independent events.

(g) Find $P(F)$ if $P(A \cup F) = .8$,and A and F are independent events.

Question 3: Find the following probabilities. If you cannot calculate the probability, explain why:

(a) $P(Z \cap Q) = .25$, $P(Z) = .6$. What is $P(Q|Z)$?

(b) $P(A \cap B) = .3$, $P(B|A) = .4$. What is $P(A)$?

(c) $P(G \cap W) = .8$, $P(W) = .2$. What is $P(G|W)$?

(d) $P(H) = .2$, $P(D|H) = .6$. What is $P(D \cap H)$?

(e) $P(D) = .8$. Using this information, and your answer to (d), find $P(H|D)$.

(f) $P(M \cap P) = .8$, $P(P) = .81$. What is $P(M|P)$?

(g) $P(L \cap E) = .6$, $P(L|E) = .05$. What is $P(L)$?