Homework 2 solution

1. Let S = woman smokes, L = low birthweight

(a) $\Pr(S) = \frac{3726}{9793} = \boxed{0.380}$

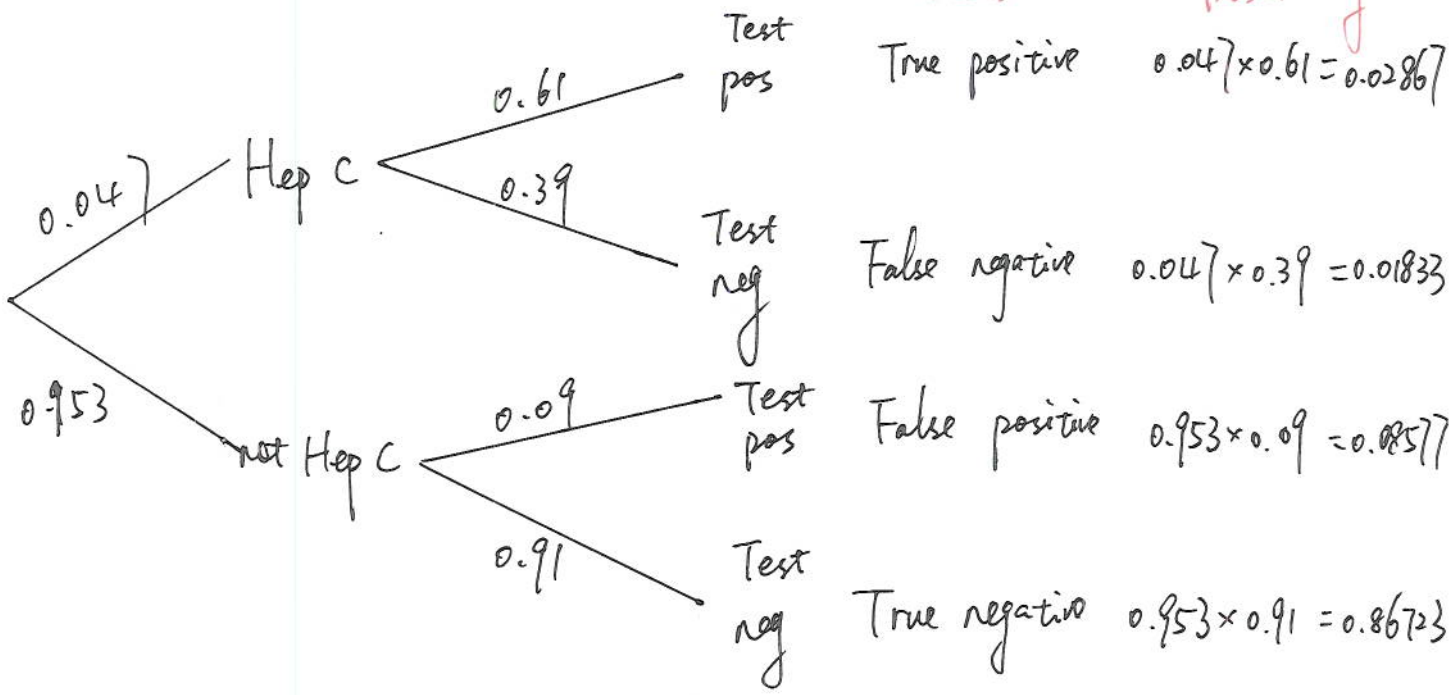
(b) $\Pr(L) = \frac{434}{9793} = \boxed{0.044}$

(c) $\Pr(L \mid S) = \frac{\Pr(L \text{ and } S)}{\Pr(S)} = \frac{237/9793}{0.380} = \boxed{0.064}$

(d) No. Because $P(L \mid S) \neq P(L)$.

2.

(a)



Event	Probability
True positive	$0.047 \times 0.61 = 0.02867$
False negative	$0.047 \times 0.39 = 0.01833$
False positive	$0.953 \times 0.09 = 0.08577$
True negative	$0.953 \times 0.91 = 0.86723$

(b) $\Pr(\text{test positive}) = \Pr(\text{Hep C})\Pr(\text{Test pos} \mid \text{Hep C}) + \Pr(\text{not Hep C})\Pr(\text{test pos} \mid \text{not C})$

$= 0.047 \times 0.61 + 0.953 \times 0.09$

$= \boxed{0.11444}$

(c) $\Pr(\text{Hep C} \mid \text{test positive}) = \frac{\Pr(\text{Hep C, test positive})}{P(\text{test positive})} = \frac{0.02867}{0.11444} = \boxed{0.250}$