

1. a)

The equation for the joint probability entries is:

$$P(\text{Smart}, \text{Study}, \text{Pass}) = P(\text{pass}|\text{Smart}, \text{Study}) * P(\text{Smart}) * P(\text{study})$$

b)

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168	0.084
Pass=F	0.006	0.054	0.112	0.336

c)

The entries accounting for “given that they pass but don’t study” are highlighted:

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168he	0.084
Pass=F	0.006	0.054	0.112	0.336

So the probability that smart is true given this is 0.126. So the probability of smart given passing the test but also not studying is $0.126 / (0.126 + 0.084) = 0.6$

d) The entries in the denominator are highlighted (given smart but not passing):

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168he	0.084
Pass=F	0.006	0.054	0.112	0.336

SO the probability is $0.054 / (0.06 + 0.054)$, which is 0.9

e)

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168	0.084
Pass=F	0.006	0.054	0.112	0.336

Given smart is highlighted for the denominator, which equals: 0.3:

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168	0.084
Pass=F	0.006	0.054	0.112	0.336

The blue highlight is the numerator, which is .24

$$.24/.3 = 0.8 \text{ (answer)}$$

f)

	Smart=T		Smart=F	
	Study=T	Study=F	Study=T	Study=F
Pass=T	0.114	0.126	0.168	0.084
Pass=F	0.006	0.054	0.112	0.336

Add up all the highlighted values for the denominator, add the blue values to be put in the numerator:

$$(.114+.168) / (.114+.168 + .006 + .112) = .705$$

2.