These are the types of questions you should be able to understand and answer to ace our next quiz in probability

1) In a certain population suppose 4% of boys are color blind and 1.4% of girls are color blind. We do a color blind test to a sample of children from this population, 60% of whom are boys. What percentage of the color blind children do we expect to be girls?

P[color blind | boy] = .04
P[color blind | girl] = .014
P[boy]=.60
P[girl|color blind] =?

a) make a tree diagram
b) use Baye's Theorem
P[G|CB] = P[CB|G]*P[G] / (P[CB|G]*P[G] + P[CB|B]*P[B])
       = .014*.4 / (.014*.4 + .04*.6)
       = .0056 / .0296
       = .1892

2) You are taking a bus to Cleveland, stay the night and then take another bus to New York City, and you bring a bag of trail mix with you. If the Chicago-Cleveland bus hits traffic, you'll get super hungry and there's a 90% chance you will eat the trail mix. If the bus arrives to Cleveland without hitting traffic there is only a 55% chance that you will devour the trail mix. There is a 45% chance the bus hits traffic.

So you get to Cleveland and stay the night in a hotel. The next day you have a good breakfast and take the bus to New York, stopping along the way for a meal (you don't touch the trail mix on the way to New York, whether or not you still have any)

When you get to New York, you suffer amnesia and can't remember whether or not the bus ride from Chicago to Cleveland hit traffic. All you know is that you ate all of your trail mix. What is the probability that your bus to Cleveland was delayed in traffic?

P[Eat trail mix | traffic] = .90
P[eat trail mix | no traffic] = .55
P[Traffic] = .45
P[Traffic | eat trail mix] = ?

a) make tree diagram
b) use Baye's Theorm
P[T|Ate] = P[Ate|T]*P[T] / (P[Ate|T]*P[T] + P[Ate|no T]*P[no T])
       = .90*.45 / (.90*.45 + .55*.55)
       = .405 / .7075 = .5724

3)
75% of kids who get into a fight at the playground get a black eye. 40% of kids with a black eye also have bruised shins. What is the probability a kid who has a fight will get a black eye and bruised shins?

P[black eye] = .75
P[brusied shin | black eye] = .40
P[bruised shin & black eye]=?

P[A and B]=P[B]*P[A|B]
P[shin & eye] = P[eye] * P[shin | eye]
= .75*.40 = .30