

# AP Statistics

## M9Z

### Chapter 6: Probability

#### Homework 7

1. It is estimated that 1% of the women population has a disease.  
The disease can be diagnosed with the use of a mammogram.  
For a woman who has the disease, the mammogram will return a positive result (indicating that the woman suffers from the disease) 80% of the time.  
For a woman who does not have the disease, the mammogram will return a negative result 90% of the time.  
If a woman receives a positive mammogram result, what is the probability that they have the disease?
  
2. A doctor is called to see a sick child. The doctor knows that 90% of the sick children have the flu, while the rest of the sick children have measles. Assume that there are no other illnesses going around. A well-known symptom of measles is a rash.  
More specifically, out of all the children who have contracted the measles, 95% of them will develop a rash. However, it is not uncommon for a child with flu to develop a rash. 80% of the children with flu will develop a rash.  
The doctor examines the sick child and she notices that the child has developed a rash. What is the probability that the child has measles?
  
3. A person uses his car 30% of the time, walks 30% of the time, and takes the bus 40% of the time as he goes to work. He is late 10% of the time when he walks; he is late 30% of the time when he drives; and he is late 7% of the time when he takes the bus.
  - (i) What is the probability that he is late to work?
  - (ii) If the person was late to work, what is the probability he took the bus?
  - (iii) If the person was on time to work, what is the probability he walked?

4. Consider 3 coins where two are fair, yielding tails with probability 50%, while the third coin yields heads with probability 0.75. For simplicity, assume that the coins are numbered 1-3, and that coins 1 and 2 are fair, while coin 3 is tampered with.
- (i) A coin is randomly chosen and flipped. What is the probability that it yields tails?
  - (ii) A coin is randomly selected and is tossed 3 times (the same coin), yielding 3 heads. What is the probability that the coin is tampered with?
- You can safely assume that the outcomes of successive coin flips are independent.