

## Assignment 2- Due 7/3/2017 by 12:59pm

### Q1 (20pts)

- a) assume a dice is rolled- what is the probability of getting a number less than 4? (10)
- b) Which of these numbers cannot be a probability? Can pick more than one (5)
  - a) -0.00001
  - b) 0.5
  - c) 1.001
  - d) 0
  - e) 1
- c) A die is rolled and a coin is tossed, find the probability that the die shows an even number and the coin shows a tails. (10)

### Q2- (20pts)

A doctor is called to see a sick child. The doctor has prior information that 90% of sick children in that neighborhood have the flu, while the other 10% are sick with measles. Let F stand for an event of a child being sick with flu and M stand for an event of a child being sick with measles. Assume that there are no other maladies in that neighborhood.

A well-known symptom of measles is a rash (the event of having which we denote R).  $P(R | M) = .95$ . However, occasionally children with flu also develop rash, so that  $P(R | F) = 0.08$ .

Upon examining the child, the doctor finds a rash. What is the probability that the child has measles?

Q3 (15pts)

Hannah Smith keeps careful records of the fuel efficiency of her car. After the first 80 times she fills the tank, she found the mean was 24.1 miles per gallon (mpg) with a population standard deviation of 0.9 mpg. Compute the 90 percent confidence interval

Q4(20pts)

Blood glucose levels for obese patients have a mean of 100 with a standard deviation of 15. A researcher thinks that a diet high in raw cornstarch will have a positive or negative effect on blood glucose levels. A sample of 30 patients who have tried the raw cornstarch diet have a mean glucose level of 140. Test the hypothesis that the raw cornstarch had an effect- give details on the steps of hypothesis testing

Q5. (25pts)

A doctor believes that tumor volume is different amongst brain and liver cancers. The doctor measures the tumor volumes of patients in his hospital and collect the following data.

	Brain	Liver
n	20	17
mean	16.2cm <sup>3</sup>	19.35cm <sup>3</sup>
sd	3.49	14.4

What can we conclude about the brain and liver tumor volumes?

Give specific details of the hypothesis testing process.

