**Homework 1**

Chengbo Gu

**Problem 1**

(a) Let  denotes the event that none has high blood lead level in a randomly selected group of 16 children.

Then 

(b) Let denotes the event that one child has high blood lead level in a randomly selected group of 16 children.

Then 

(c) Let denotes the event that two children have high blood lead level in a randomly selected group of 16 children.

Then 

(d) Let denotes the event that three or more have high blood lead level in a randomly selected group of 16 children.

Then 

**Problem 2**

Let  denotes the height of corn plants, then 

(a) 

Because and ,



(b) According to central limit theory, .

Thus,  for a random sample of 16 plants.



Because and ,



(c) According to central limit theory, .

Thus,  for a random sample of 32 plants.





**Problem 3**

Let denotes the event that individuals preferred to use right hand to write.

Let denotes the event that individuals preferred to use right foot to kick a ball.

Then 



Since , hand and foot preferences are not independent.

**Exercise 2.1**

Let G denotes a child is a girl.

Let B denotes a child is a boy.

Let A denotes that at least one child is boy.

Then we have 

(a) The question actually asks what is .

Using Bayes rules, we have



(b) Let b denotes the event that I happen to see one of his children and it is a boy.

The question actually asks what is .

Using Bayes rules, we have



**Exercise 2.2**

**Exercise 2.4**

Let  denotes the event that one has this disease.

Let  denotes the event that the test is positive.

Then we have  and .

We want to infer .

Using Bayes rules,



**Exercise 2.5**

Let  denotes the event that the prize was behind door 1.

Let  denotes the event that the prize was behind door 2.

Let **** denotes the event that the prize was behind door 3.

Let  denotes the event that I choose door 1 and the host open door 3.

Then we have , ,  and .

Thus, 





So, it is better to switch to door 2.

**Exercise 2.12**



Similarly,

