HW#5

Section 4.1 P.160

12. a) (101+33)/492=0.272

b) 33/492=0.067

13..a) 4-6pm. Probability is 0.224

b) P(2pm-8pm)=0.179+0.224+0.191=0.594

P(noon-10pm)=0.097+0.179+0.224+0.191+0.098=0.789

Section 4.2 P.173

2.a) –d) p(1)= p(2)= p(3)= p(4)=1/4

e) P(even number)=1/2

f) P(number less than 4)=3/4

3. a) 1/10

b) 1/2

5. a) P(black)=1/2

b) P(heart)=1/4

c) P(ace)=4/52=1/13

d) P(king of diamond)=(1/4)*(1/13)=1/52

6 a) P(sum=2)=1/36

b) P(sum=7)=6/36=1/6

c) P(sum=10)=3/36=1/12

d) P(sum=6)=5/36

e) P(sum is at most 5)=P(sum=2)+ P(sum=3)+ P(sum=4)+ P(sum=5)=10/36=5/18

f) P(sum is at least 10)= P(sum=10)+ P(sum=11)+ P(sum=12)=6/36=1/6

7. a) 18/38=9/19

b) 4/38=2/19

10. a) The genotype of the woman is Bb (means Bb or bB)

b)

gene from father	gene from mother	outcome
b	B	bB
	b	bb

p(blue eye)=1/2 and second child being blue-eye is not influenced by the first child's condition. Thus the chance that the second child will also be blue eye is (1/2)*(1/2)=1/4

c) Since the first child is blue eye, it's impossible that the brown-eyed parents have BB genotype, just Bb or bB.

gene from father	gene from mother	outcome
B	B	BB

	b	Bb
b	B	bB
	b	bb

so, p(blue eye)=1/4   P(the second is blue)=(1/4)*(1/4)=1/16, here we know that the first child have had blue-eye, that means P(second blue| first is blue). Since the two is independent, this probability= P(both are blue eye).

14. a) 1/4 b) 1/4 c) 1/2

Section 4.3 P.195

4. We use the five-step method to estimate the distribution of the random variable defined as the number of the girls in a family with 4 children.

Step1: Choice of Model

The probability of being girls is 1/2. Let's identify the digit 1 as girl and digit 0 as boy.

Step2: Definition of one simulation

The number of girls in 4 children corresponds to selecting 4 digits according to the probability model described in step1. Each 1 occurring corresponds to girl.

Step3: Definition of Statistics of Interest:

The number of girls corresponds to the number of 1s in the four digits chosen in step2.

Step4. Repetitions of Simulation

We use table B.1 to simulate 40 repetitions. Using the first four digits in each row in Table B.1. For the first simulations, use 0111 in the first row. For the second simulation, use 1110 in the second row, and so on.

Repetition	Random Digit	Number of girls
1	0111	3
2	1110	3
3	1111	4
4	1000	1
.	.	.
.	.	.
40	0001	1

Step5. Find the experimental probability distribution

7.We use the five-step method

Step1: Choice of Model

If the manufacturer's claim is true, the probability is 0.95. Select a pair random digit from table B.3. There are 100 equally likely pairs:00,01…99. If we pick 01 through 05, the print doesn't develop. If we pick 00 or 06 through 99, the print develops successfully.

Step2: Definition of one simulation

Checking the status of a pack by selecting 12 pairs of random digits as described in step1.

Step3: Definition of Statistics of Interest:

The number prints not developed corresponds to the number of two-digit numbers chosen in step 2 that are between 01-05.

Step4. Repetitions of Simulation
We use table B.3 to simulate 40 repetitions. Using the first 24 digits in each row in Table B.3.
Step5:Find the experimental probability distribution.

Section 4.4 P. 202

2. P(win $1)=18/38=9/19

9 balls with 2				10 balls with -1			
2	2	…………….	2	-1		-1	-1

3. p(win)=1/38
   If win, get $36 , or if lose $ -1
   So, one ball with $36 and other 37 balls with $-1.

7. 58% is green & 42% not green
   So, 58 balls in the box are green and others are not green.
   2 times /each day * 5 days=10
   So, you have chance to choose 10 balls. The event of interest is choosing 10 balls, how many of them are green.

8. 33 balls are 1, 17 balls are 6, 49 balls are 7, one ball is 2.
   Drawing balls until the first 7 obtained. Write down the number of balls. Repeat drawing with replacement…

Section 4.6 P.215
2. Outcomes:
BBB
GBB
BGB
BBG
BGG
GBG
GGB
GGG
If you know that at least of the children is a boy, then you need only consider:
BBB
GBB
BGB

BBG
BGG
GBG
GGB

All 7 choices are equally likely, and only one is the "event of interest", so P(all boys given at least one is a boy) = 1/7

Section 5.2 P.245

1. a) the expected number for the five simulated shopping trips is 18.6.
   c) d) the more trials you do, more closer to theoretical expected value.

A a) Because you can't look at the first card, it doesn't really matter which is the "first" and which is the "second." (In other words, you get no information from the first card, so you might as well just put it back in the deck and draw again for the second card.) So P(second is red)=1/2.

b) There are only 51 cards left, and 26 of them are red, so prob = 26/51

B. with replacement., they are independent.
   a) b) 1/2