Homework 2

Probability and Statistics

Requirement

- Send soft copies (digital files) to the following email address: 25b358009@stu.hit.edu.cn

- Submit within a week! Late submission should have a reasonable explanation.

- You may discuss with others. Write homework by yourself.

1. In order to control costs, a company wishes to study the amount of money its sales force spends entertaining clients. The following is a random sample of six entertainment expenses (dinner costs for four people) from expense reports submitted by members of the sales force. DS DinnerCost

$$\$157 \quad \$132 \quad \$109 \quad \$145 \quad \$125 \quad \$139$$

a Calculate $\bar{x}$, s^2, and s for the expense data. In addition, show that the two different formulas for calculating s^2 give the same result.

b Assuming that the distribution of entertainment expenses is approximately normally distributed, calculate estimates of tolerance intervals containing 68.26 percent, 95.44 percent, and 99.73 percent of all entertainment expenses by the sales force.

2 Thirteen internists in the Midwest are randomly selected, and each internist is asked to report last year's income. The incomes obtained (in thousands of dollars) are 152, 144, 162, 154, 146, 241, 127, 141, 171, 177, 138, 132, 192. Find:

a The 90th percentile.

b The median.

c The first quartile.

d The third quartile.

e The 10th percentile.

f The interquartile range.

g Develop a graphical display of a five-number summary and a box-and-whiskers display.

3. Basic concepts of probability：

Define the following terms: *experiment, event, probability, sample space.*

Explain the properties that must be satisfied by a probability.

4. The following contingency table summarizes the number of students at a college who have a Mastercard or a Visa credit card.

	Have Visa	Do Not Have Visa	Total
Have Mastercard	1,000	1,500	2,500
Do not have Mastercard	3,000	4,500	7,500
Total	4,000	6,000	10,000

a Find the probability that a randomly selected student
   (1) Has a Mastercard.
   (2) Has a VISA.
   (3) Has both credit cards.

b Find the probability that a randomly selected student
   (1) Has a Mastercard or a VISA.
   (2) Has neither credit card.
   (3) Has exactly one of the two credit cards.

5. Each month a brokerage house studies various companies and rates each company's stock as being either "low risk" or "moderate to high risk." In a recent report, the brokerage house summarized its findings about 15 aerospace companies and 25 food retailers in the following table:

Company Type	Low Risk	Moderate to High Risk
Aerospace company	6	9
Food retailer	15	10

If we randomly select one of the total of 40 companies, find

a The probability that the company's stock is moderate to high risk given that the firm is an aerospace company.

b The probability that the company's stock is moderate to high risk given that the firm is a food retailer.

c Determine if the events *the firm is a food retailer* and *the firm's stock is low risk* are independent. Explain.