

請以中文作答：

1. (25%) A stationery supply store receives a shipment of a certain brand of inexpensive ball-point pens from a manufacturer. The owner of the store wishes to estimate the proportion of pens that are defective. A random sample of 300 pens is tested, and 30 are found to be defective.
- Set up a 90% confidence interval estimate of the proportion of defective pens in the shipment.
 - The shipment can be returned if it is more than 5% defective; on the basis of the sample results, can the owner return this shipment?
 - Suppose that a 99% confidence interval estimate was desired in (a). What would be the effect of this change on your answers to (a) and (b)?

2. (25%) The marketing director of a cable television company is interested in determining whether there is a difference in the proportion of households that adopt a cable television service based on the type of residence (single-family dwelling, two- to four-family dwelling, and apartment house). A random sample of 400 households revealed the following:

PURCHASE CABLE TELEVISION?	TYPE OF RESIDENCE			TOTAL
	SINGLE-FAMILY	TWO- TO FOUR-FAMILY	APARTMENT HOUSE	
Yes	94	39	77	210
No	56	36	98	190
Total	150	75	175	400

At the .01 level of significance, is there evidence of a significant difference among types of residence with respect to the proportion of households that adopt the cable TV service?

3. (25%) Given the following probability distributions for variables X and Y

$P(X_i, Y_i)$	X	Y
.2	-100	50
.4	50	30
.3	200	20
.1	300	20

Compute

- | | |
|----------------|----------------------|
| (a) $E(X)$ | (e) σ_{XY} |
| (b) $E(Y)$ | (f) $E(X + Y)$ |
| (c) σ_X | (g) $\sigma_{X + Y}$ |
| (d) σ_Y | |

4. (25%) Given the following two sets of data—each with samples of size $n = 7$:

Set 1:	10	2	3	2	4	2	5
Set 2:	20	12	13	12	14	12	15

- For each set, compute the mean, median, mode, midrange, and midhinge.
- Compare your results and summarize your findings.
- Compare the first sampled item in each set, compare the second sampled item in each set, and so on. Briefly describe your findings here in light of your summary in part (b).
- For each set, compute the range, interquartile range, variance, standard deviation, and coefficient of variation.
- Describe the shape.
- Compare your results in (d) and (e) and discuss your findings.
- On the basis of your answers to (a)–(f) above, what can you generalize about the properties of central tendency, variation, and shape?