1. 前三章知识与Probability的相似之处.

1.1 章节与知识节构.

2. 典型题型与考点..

3. probability在后续章节的作用.

Probability ⇒ Cumulative Relative Frequency

事件发生可能性的度量

一个数据值出现的频繁性的度量

Event

Random Variable

takes a value. eg. $X=a$

or takes a range eg $a \le X \le b$

Proportion $(a \le X \le b)$

same.

$P(a \le X \le b) =$

Distribution of Prob. vs Distr. of Data.

Categorical → Prob. of event A. P(A)

→ Marginal distribution

Conditional Probability P(A|B).

→ Conditional distribution

⇒ 2-way table.

	home	away
order food	231	134
don't order food	208	85

Prob. of event

P(rooting for home team) = $\frac{31}{31+206+13480}$

randomly select 1 person, the probability of he/she rooting for home team is ....

Same concept.

Marginal distribution

the proportion of people not for home team is .....

Conditional Prob.

Given that a randomly selected person buy food, what is the probability that he is rooting for the home team.

P(rooting for home team | buys food).

Conditional distribution.

What is the proportion of people rooting for home team among the people that buys food.

Event Independence VS Variable No Association.

A&B Independent

无论B发生与否，A的概率相同.

$$P(A|B) = P(A) = P(A|B^C)$$

比例 | 同. 没关系

Proportion of people rooting for home In people buying food.

Proportion of people rooting for home team In people not buying fd

Proportion of people rooting for home team

2 variables have no association.

Quantitative

Random Variable | Variable.

all have (1) Mean.

pop. mean

Sample mean.

$E(X)$ or μ_X ⋮ μ_X or $\bar{X}$

only in Random Variable

we call it Expected Value.

用同样的符号，在SRS下，有相同数值

(2) Variance. $\sum (x_i - \mu_x)^2 w_i$

R.V. σ_x^2 | Variable. σ_x^2 s_x^2

$w_i = p_i$

when all x_i equally likely to happen.

$p_i = \frac{1}{N}$

$w_i = \frac{1}{n-1}$ or $\frac{1}{N}$

for sample variance

Standard deviation.

R.V. σ_X | Variable δ_X or s_X

Same variable transformation

$Y = aX + b$. a, b constant.

$\mu_Y = a\mu_X + b$. | for all

$\bar{Y} = a\bar{X} + b$.

$Z = aX + bY + c$ | a, b, c constant

$\mu_Z = a\mu_X + b\mu_Y + c$ | all the same.

$$\bar{z} = a\bar{x} + b\bar{y} + c$$

$$Y = aX + b.$$

$$Var(Y) = a^2 Var(X). \quad \text{no } b.$$

$$Std(Y) = |a| Std(X)$$

$$Z = aX + bY + c$$

$$Var(Z) = a^2 Var(X) + b^2 Var(Y)$$

$* X$ & Y independ / no relationship

$\downarrow$

$r = 0$

Same for R.V and V.

$$std(z) = \sqrt{a^2 std^2(x) + b^2 std^2(y)}$$

根据概率性质，做推断.

Hypothesis testing → 等 p-value.

↑

probability.