Chapter 1

Quantitative Data

Qualitative Data

*Data Collection

- observation
- experiment
- simulation
- survey

*Sampling Techniques

- simple random sample
- cluster
- stratified
- systematic
- convience

Chapter 2

frequency distribution

- classes
- interval
- class width
- tallies
- * Graphs * (Stat Plot from Calculator)
  - * → histograms
- midpoint
- relative frequency

Stem-and-Leaf

Pie Chart

Pareto Chart

Measures of Central Tendency

- mean
- median
- mode
- range
- deviation
- standard deviation

outliers

weighted mean

frequency mean

Shape → symmetric
uniform
skew Right
skew left

Emphirical Rule

Box-and-Whisker
min, Q_1, median, Q_3, max

IQR → $Q_3 - Q_1$

Chapter 3

Rule of Large Numbers

Probability

Frequency Probability

Complement of an Event

Tree Diagram

Conditional Probability

- $P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$

Independent

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

or $P(A|B) = P(A)$

and → multiply

or → add

Mutually Exclusive

are mutually exclusive

$P(A \text{ or } B) = P(A) + P(B)$

$P(A \text{ and } B) = P(A) \cdot P(B)$

are not mutually exclusive

$P(A \text{ and } B) =$

$P(A \text{ or } B) =$

$P(A) + P(B) - P(A \text{ and } B)$

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Permutation "password" ${}_nP_r = \frac{n!}{(n-r)!}$

Combination "pizza" ${}_nC_r = \frac{n!}{(n-r)!\,r!}$

Chapter 4

Random Variable

Discrete

Continuous

*Discrete Probability Rules

1) $0 \leq P(x) \leq 1$
2) $\Sigma P(x) = 1$

*Discrete mean $\mu = \Sigma x \cdot P(x)$

standard deviation $\sqrt{\Sigma (x-\mu)^2 \cdot P(x)}$ ← the table on worksheet

Expected Value

Gain				
P(x)				

Binomial Probability $_nC_x \cdot (p^n) \cdot (q^{n-x})$

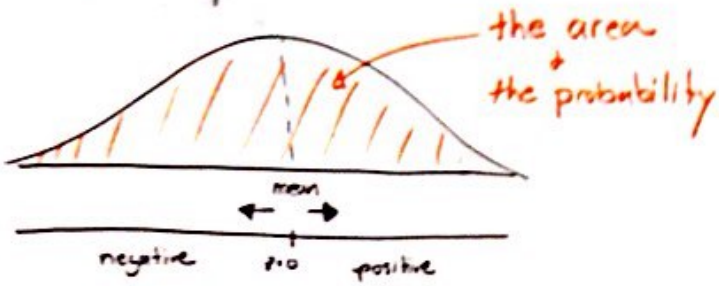
n = sample size

x =

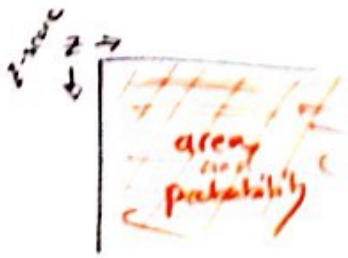
p = prob. of sucess

q = prob. of failure

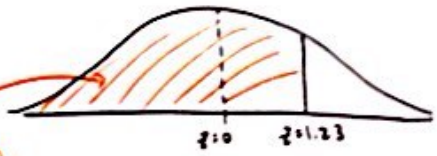
Chapter 5 Normal Distribution



$$z = \frac{X - \text{mean}}{\text{St. dev.}}$$

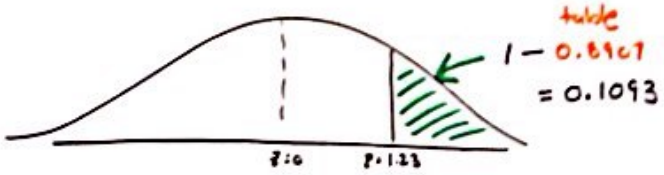


Example



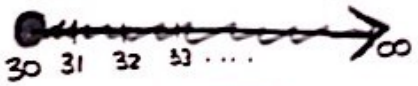
area the from table = 0.8907

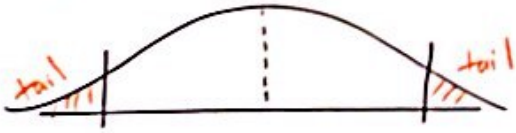
✳ **Z** when $n \geq 30$



Chapter 6 Confidence Interval

✳ **Z** when $n \geq 30$





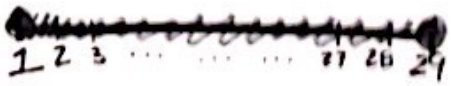
✳ Find the area of the tails

✳ Find the corresponding z-value

↑ this is $\pm z_c$

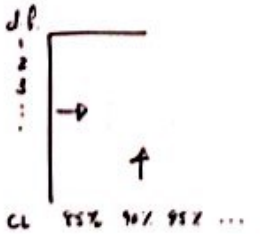
$$E = z_c \cdot \frac{\text{St. dev.}}{\sqrt{n}}$$

✳ **t** when $n < 30$



✳ $d.f. = n - 1$

✳ CL = ___ (CL = confidence level)



$$E = \pm t_c \cdot \frac{\text{St. dev.}}{\sqrt{n}}$$

Regression

Input Data: "Stat" → "Edit" → Enter

Graph: Turn on "Stat Plot" → [2nd y=] → [Enter] → "on"  X: L1 Y: L2

Graph: [Zoom] [#9]

Linear Regression: [Stat] → [→] → [#4] LinReg (ax+b)

Correlation Coefficient ⇒ r ; between 0 and 1 positive
0 and -1 negative

strong negative | strong positive | moderate negative | moderate positive

Non-Linear Regression

$X=L_1$ $Y=L_2$

$(x, y)_{L_1 L_2} \rightarrow (x, \log y)_{L_1 L_3}$, or $(\log x, \log y)_{L_3 L_4}$

or $(\log x, y)_{L_3 L_2}$

Steps:

1. enter (x,y)
2. GRAPH
3. RESIDUAL PLOT → Linear = No Pattern
   → Non-Linear = Pattern
4. TRANSFORM THE DATA
5. Linear Regression w/ transformed data to get r and r^2
6. Check Residual Plot

1. The Residual plot is scattered, and R^2 = ____ indicating that the model explains ____ of the variability in the number of y-variable

2. For every one unit of the explanatory variable, the response variable increases or decreases by slope.