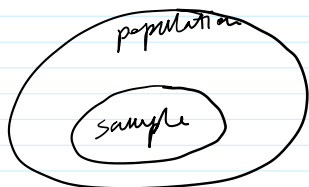


Review.

— population vs sample



Suppose sample $\{x_1, x_2, \dots, x_n\}$

n - sample size
sample mean $\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$

sample standard deviation $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$

sample variance s^2 (σ^2)

$n < 30$ CLT

— probability

① $0 \leq P(E) \leq 1$

Note: prob deals with random chance.

prob measures how likely something is to happen.

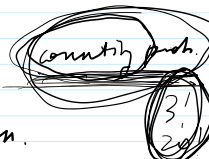
✓ prob is always a real number between 0 and 1 (inclusive).

✗
✗

② The prob of the entire sample space (S) must be 1.

* ③ disjoint

If E_1 and E_2 are disjoint events, $P\{E_1 \text{ or } E_2\} = P(E_1) + P(E_2)$



Lab 01 Stat 230 2022W2

Question 1

Data collected by the Oil Price Information Service from more than 90,000 gasoline and convenience stores throughout the U.S. showed that the average price for a gallon of unleaded gasoline was \$3.28 (MSN Auto website, February 2, 2014). The following data show the price per gallon (\$) for a sample of 20 gasoline and convenience stores located in San Francisco.

3.59 3.59 4.79 3.56 3.55 3.71 3.65 3.60 3.75 3.56
3.57 3.59 3.55 3.99 4.15 3.66 3.63 3.73 3.61 3.57

(a) use the sample data to estimate the mean price for a gallon of unleaded gasoline in San Francisco

(b) Compute the sample standard deviation. (2 points)

(c) What is the median value. (2 points)

(d) What is IQR? (2 points)

Question 2

Suppose $S = \{1, 2, 3\}$, with $P(\{1\}) = 1/2$ and $P(\{1, 2\}) = 2/3$. What must $P(\{2\})$ and $P(\{3\})$ be? (2 points)

Question 3

A card is selected from a well shuffled pack (the experiment). What is the probability of it being cards with the face? (3 points)

Question 4

(a) (1 point) How many distinct words can be created by rearranging the letters in 'aardvark'?

(b) (1 point) How many distinct 4 letter 'words' can be made using the letters of haricots each letter no more than once?

Q2.

$S = \{1, 2, 3\}$

$\{1\}, \{2\}, \{3\}$

disjoint events.

$P(\{2\}) = 2/3 - 1/2 = 1/6$

$P(\{3\}) = 1 - P(\{1\}) - P(\{2\})$

$\text{or } 1 - P(\{1, 2\}) = 1 - 2/3 = 1/3$

Q3. $12/52 = P(\text{face})$ $\frac{4 \times 3}{4 \times 52} = 12$

Q4. arrangement question

1a) $\frac{8!}{3!2!} = 8$ $\frac{3 \times 2}{2 \times 1} = 3$

1b) $\frac{8!}{3!2!} = 8$

$\frac{8!}{3!2!} = 8$

Q1

(a) $\bar{x} = \frac{\sum_{i=1}^n x_i}{n} = (3.59 + 3.59 + \dots) / 20 = 3.72$

(b) $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(3.59-3.72)^2 + \dots + (1)^2}{20-1}} = 0.2948$

(c) sort the data min — max

(3.55 3.55 3.56 3.56 3.57 3.57 3.59 3.59 3.59 3.60)
(3.61 3.63 3.65 3.66 3.71 3.73 3.75 3.99 4.15 4.79)

n odd

n even

$\frac{n+1}{2}$

$n=20$

median $\frac{3.60+3.61}{2}$

$= 3.605$

(d) IQR = $Q_3 - Q_1$

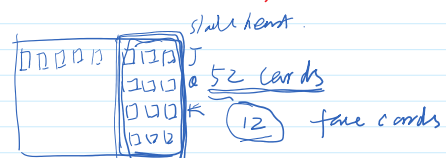
75% 25%



$Q_1 = \frac{3.57+3.57}{2} = 3.57$ the five-number summary

$Q_3 = \frac{3.71+3.73}{2} = 3.72$

$\therefore \text{IQR} = Q_3 - Q_1 = 3.72 - 3.57 = 0.15$



4-steps mask