Statistics

Lecture 26

Feb 19-8:47 AM

Class Quiz 8

$P(A) = .8$ $P(B) = .6$ $P(A \text{ and } B) = .5$

1) $P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)} = \frac{.5}{.6} = \frac{5}{6} \approx .833$ ✓

(And; $P(B)$)

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

$= .8 + .6 - .5 = .9$

Oct 10-9:34 AM

Data
- 1) Qualitative
  - Non-Numerical
- 2) Quantitative
  - Numerical
    - 1) Discrete
      - Countable
    - 2) Continuous
      - Measureable

Oct 14-8:52 AM

Now prob. dist.

Prob. dist. provides the prob. of all Possible outcomes.

Prob. dist. could be

1) in form of a table
2) in the form of a chart
3) in the form of a graph
4) using some sort of formula.
5) using concept of prob. to set-up the table.

Oct 14-8:54 AM

Let x be a discrete random variable with prob. dist. $P(x)$.

1) $0 \le P(x) \le 1$

2) $\sum P(x) = 1$

3) $P(x) = 0 \longleftrightarrow$ Impossible event

4) $P(x) = 1 \longleftrightarrow$ Sure event

5) $0 < P(x) \le .05 \longleftrightarrow$ Rare event

Oct 14-8:58 AM

Consider the chart below

x	$P(x)$
1	.2
2	.5
3	.3

1) Verify $\sum P(x) = 1$

$.2 + .5 + .3 = 1$ ✓

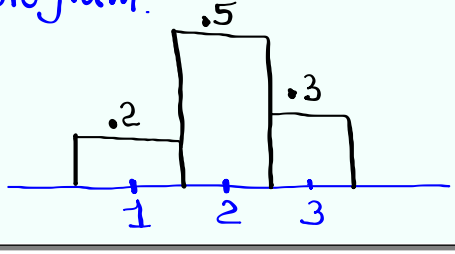
2) $P(x \le 2) = .5 + .2 = .7$

3) $P(x \ge 2) = .5 + .3 = .8$

4) Draw Prob. dist. histogram.

$x \to$ Midpoint

$P(x) \to$ Rel. freq.



Oct 14-9:01 AM

Consider the chart below

x	P(x)
1	.2
2	.4
3	.3
4	.1

1) $P(x=4) = 1 - [.2 + .4 + .3]$ (1 = Total Prob.)
$= 1 - .9 = \boxed{.1}$

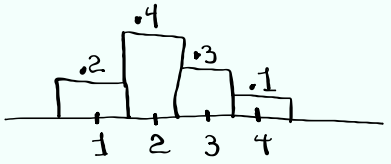
2) $P(x \geq 2) = .4 + .3 + .1 = \boxed{.8}$

3) $P(x=2 \text{ or } x=3) = .4 + .3 = \boxed{.7}$

4) Draw Prob. dist. histogram.

$x \rightarrow$ Midpoint

$P(x) \rightarrow$ Rel. F.



Oct 14-9:05 AM

Complete the chart below

x	P(x)	xP(x)	$x^2P(x)$
1	.3	.3	.3
3	.5	1.5	4.5
5	.2	1.0	5.0

1) $\sum x = 9$

1.5) $\sum P(x) = 1$

2) $\sum xP(x) = 2.8$

3) $\sum x^2P(x) = 9.8$

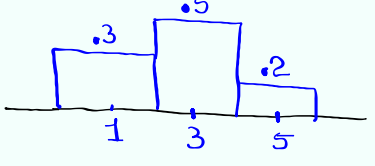
4) Compute $\sum x^2P(x) - (\sum x)^2 = 9.8 - 2.8^2 = \boxed{1.96}$

5) $\sqrt{\text{last ans.}} = \sqrt{1.96} = \boxed{1.4}$

6) Draw Prob. dist. histogram

$x \rightarrow$ Midpoint

$P(x) \rightarrow$ Rel. F.



Oct 14-9:11 AM

Complete the chart below

x	$P(x)$	$xP(x)$	$x^2P(x)$
1	.1	.1	.1
2	.2	.4	.8
3	.4	1.2	3.6
4	.3	1.2	4.8

1) $\sum P(x) = 1$

2) $\sum xP(x) = 2.9$

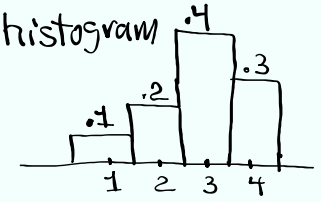
3) $\sum x^2P(x) = 9.3$

4) Compute $\sum x^2P(x) - \left(\sum xP(x)\right)^2$

$= 9.3 - 2.9^2 = \boxed{.89}$

5) $\sqrt{\text{Last Ans}} = \sqrt{.89} \approx \boxed{.943}$

6) Draw Prob. dist. histogram



Oct 14-9:20 AM

Mean μ (mu) $\boxed{\mu = \sum xP(x)}$

Variance σ^2 (Sigma^2) $\boxed{\sigma^2 = \sum x^2P(x) - \mu^2}$

Standard deviation σ (Sigma) $\boxed{\sigma = \sqrt{\sigma^2}}$

x	$P(x)$
1	.3
2	.6
3	.1

$x \to$ L1, $P(x) \to$ L2

1-Var Stats with L1 & L2

$\mu = \bar{x} = 1.8$

$\sigma = \sigma_x = .6$

$n = 1$

VARS

5: Statistics

4: σ_x x^2 Enter

$\sigma^2 = .36$

Oct 14-9:31 AM

2 dimes, 3 nickels

Select 2 coins with replacement

DD → 20¢ $P(20¢) = \frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25} = .16$

DN
ND → 15¢ $P(15¢) = 2 \cdot \frac{2}{5} \cdot \frac{3}{5} = \frac{12}{25} = .48$

NN → 10¢ $P(10¢) = \frac{3}{5} \cdot \frac{3}{5} = \frac{9}{25} = .36$

Total	P(Total)
20¢	.16
15¢	.48
10¢	.36

$\mu = \bar{x} = 14$

$\sigma = \sigma_{\bar{x}} = 3.464$

$n = 1$

Total → L1, P(Total) → L2

Stat → CALC

1:1-Var Stats

List: L1

FreqList: L2

Calculate

L1, L2, Enter

VARS → 5: Statistics

4: $\sigma_{\bar{x}}$ → x^2 → Enter

$\sigma^2 = 12$

Oct 14-9:38 AM

There are 4 Females, 6 Males and 5 Kids.

Select 3 people.

1) $P(\text{All Females}) = \frac{{}_4C_3 \cdot {}_6C_0 \cdot {}_5C_0}{{}_{15}C_3} = \frac{4}{455}$

2) $P(\text{All Males}) = \frac{{}_4C_0 \cdot {}_6C_3 \cdot {}_5C_0}{{}_{15}C_3} = \frac{20}{455} = \frac{4}{91}$

3) $P(\text{All Kids}) = \frac{{}_4C_0 \cdot {}_6C_0 \cdot {}_5C_3}{{}_{15}C_3} = \frac{10}{455} = \frac{2}{91}$

4) $P(1F, 1M, 1K) = \frac{{}_4C_1 \cdot {}_6C_1 \cdot {}_5C_1}{{}_{15}C_3} = \frac{120}{455} = \frac{24}{91}$

5) $P(\text{at least 1 Kid}) = 1 - P(\text{No Kids})$

$= 1 - \frac{{}_{10}C_3 \cdot {}_5C_0}{{}_{15}C_3}$

$= 1 - \frac{120}{455} = \frac{67}{91}$

Oct 14-9:48 AM