Statistics

Lecture 5

Feb 19-8:47 AM

Class QZ 4

use the chart below

x	y
4	14
5	18
7	20
8	26
10	30

Clear all lists

$x \rightarrow L1$, $y \rightarrow L2$

STAT → CALC

8: LinReg(a+bx)

Xlist: L1

Ylist: L2

Clear

Calculate

Find

1) $a = 3.825 \approx \boxed{4}$ ✓

2) $b = 2.614 \approx \boxed{3}$ ✓ } Round to whole #

3) $r^2 = .955 \approx 95\%$ $\approx 96\%$ } whole %

4) $r = \boxed{.977}$ } 3-dec.

$\boxed{y = 4 + 3x}$

96% of Y-values are explained by x-values

r is close to 1

⇒ It is significant

Mar 20-10:54 AM

Predict y when x is 6.

a) Assume r is Significant.

$y = 4 + 3x$

$= 4 + 3(6) = \boxed{22}$

b) Assume r is not Significant.

$\bar{y} = \frac{\Sigma y}{n} = \frac{108}{5} = 21.6 \approx \boxed{22}$

Mar 27-8:09 AM

Given $P(A) = .08$

1) write $P(A)$ in reduced fraction

.08 [Math] [1:▶Frac] [Enter] $\frac{2}{25}$

2) find $P(\bar{A}) = 1 - P(A) = 1 - .08 = \boxed{.92}$

3) Simplify $\frac{P(A)}{P(\bar{A})} = \frac{.08}{.92} = \frac{2}{23}$

.08 [÷] .92 [Math] [1:▶Frac] [Enter]

Mar 27-8:12 AM

Given $P(A) = .65$, $P(B) = .45$

$P(A \text{ and } B) = .2$

1) $P(\overline{A}) = 1 - P(A)$
$= 1 - .65$
$= \boxed{.35}$

2) $P(\overline{A \text{ and } B}) = 1 - P(A \text{ and } B)$
$= 1 - .2 = \boxed{.8}$

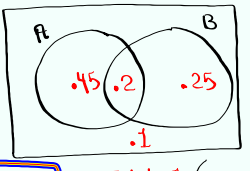
3) $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
$= .65 + .45 - .2 = \boxed{.9}$

4) $P(\overline{A \text{ or } B}) = 1 - P(A \text{ or } B)$
$= 1 - .9 = \boxed{.1}$

5) Venn Diagram

$P(A \text{ only}) = .65 - .2 = \boxed{.45}$

$P(B \text{ only}) = .45 - .2 = .25$



Total = 1 ✓

6) $P(\overline{A} \text{ and } \overline{B}) = P(\overline{A \text{ or } B}) = \boxed{.1}$

DeMorgan's Law

7) $P(\overline{A} \text{ or } \overline{B}) = P(\overline{A \text{ and } B}) = \boxed{.8}$

Mar 27-8:17 AM

Intro to odds: SG 12

Odds in favor of event E are

$\#E : \#\overline{E}$

Always reduce

ex: I took a coin and flipped it 80 times

It landed tails 30 times.

odds in favor of landing tails are

$\#\text{tails} : \#\overline{\text{tails}}$

$30 : 50 \rightarrow \boxed{3:5}$

odds against landing tails

$5:3$

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Draw a card from a standard deck of playing cards.

1) $P(\text{face card}) = \frac{12}{52} = \boxed{\frac{3}{13}}$

2) $P(\overline{\text{face card}}) = \frac{40}{52} = \boxed{\frac{10}{13}}$

3) odds in favor of drawing a face card.

$\#\text{face} : \#\overline{\text{face}}$

$12 : 40 \rightarrow \boxed{3:10}$

4) odds against drawing a face card.

$\boxed{10:3}$

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If the odds in favor of event E are $a:b$, then

$$P(E) = \frac{a}{a+b} \quad \& \quad P(\overline{E}) = \frac{b}{a+b}$$

ex: Suppose the odds in favor of event E are $4:21$.

$$P(E) = \frac{4}{4+21} = \frac{4}{25} \quad \& \quad P(\overline{E}) = \frac{21}{4+21} = \frac{21}{25}$$

Mar 27-8:36 AM

If $P(E)$ is given, then

the odds in favor of event E are

$$P(E) : P(\bar{E})$$

Always reduce

Suppose $P(E) = .08$

$P(\bar{E}) = .92$

odds in favor of event E are $.08 : .92 \rightarrow 2:23$

.08 ÷ .92 Math 1:▶Frac Enter $\frac{2}{23}$

Mar 27-8:39 AM

Back to Prob.:

Multiplication Rule

Keyword AND

Multiple Action event

Draw 2 Cards → P(Both Cards are...)

10 Females, 15 males, Select 2 people

FF FM MF MM

Mar 27-8:43 AM

Case I: Events are independent

one outcome does not change the prob. of next outcome.

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

Draw 2 Cards with replacement

$$P(\text{Two Aces}) = \frac{4}{52} \cdot \frac{4}{52} = \frac{1}{13} \cdot \frac{1}{13} = \frac{1}{169}$$

$$P(\text{Two face cards}) = \frac{12}{52} \cdot \frac{12}{52} = \frac{3}{13} \cdot \frac{3}{13} = \frac{9}{169}$$

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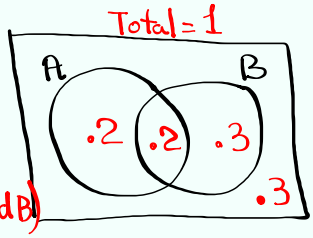
$P(A) = .4$ $P(B) = .5$

A & B are independent events

$P(\bar{A}) = 1 - P(A) = .6$

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

$= (.4)(.5) = .2$



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

$= .4 + .5 - .2 = .7$

$P(\bar{A} \text{ and } \bar{B}) = P(\overline{A \text{ or } B}) = 1 - .7 = .3$

De Morgan's Law

$P(\bar{A} \text{ or } \bar{B}) = P(\overline{A \text{ and } B}) = 1 - .2 = .8$

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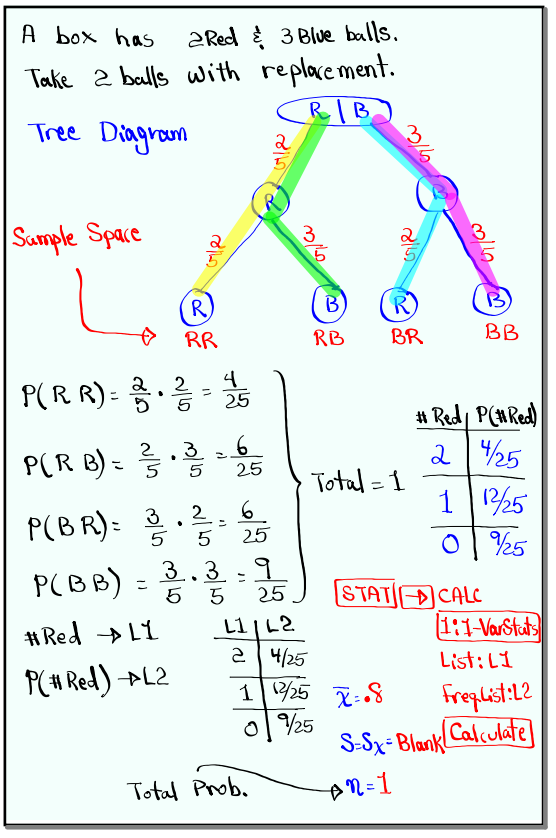

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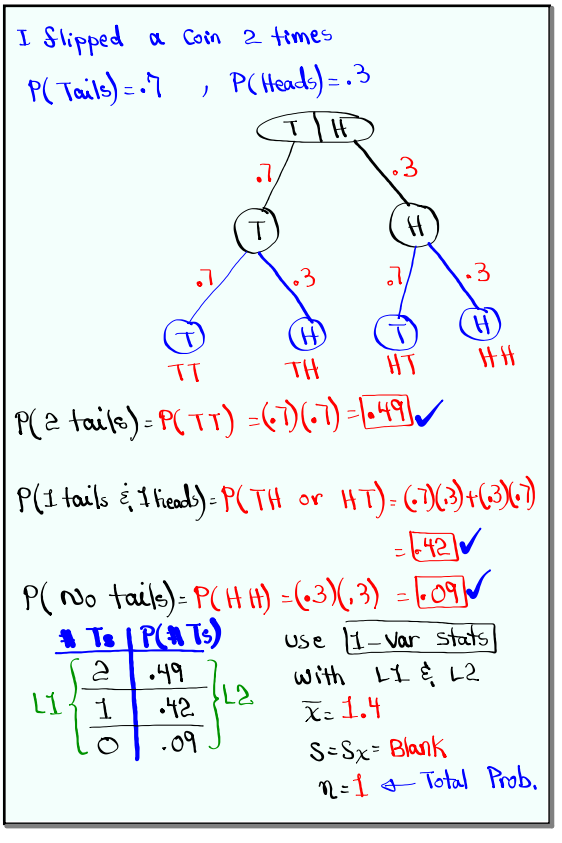

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