Statistics

Spring 2023

Lecture 24

Feb 19-8:47 AM

A box has 3 quarters and 5 dimes.

Select 2 coins, No replacement

Sample Space DD DQ QD QQ

$P(2 \text{ Dimes} = 20¢) = \frac{{}_5C_2 \cdot {}_3C_0}{{}_8C_2} = \frac{10}{28} = \boxed{\frac{5}{14}}$

$P(1D \& 1Q = 35¢) = \frac{{}_5C_1 \cdot {}_3C_1}{{}_8C_2} = \boxed{\frac{15}{28}}$

$P(2 \text{ Quarters} = 50¢) = \frac{{}_5C_0 \cdot {}_3C_2}{{}_8C_2} = \boxed{\frac{3}{28}}$

5 ÷ 14 + 15 ÷ 28 + 3 ÷ 28 enter 1

P(at least 1 dime) = 1 − P(No dimes)

DD
DQ
QD
QQ

$= 1 - P(2Q) = 1 - \frac{3}{28} = \boxed{\frac{25}{28}}$

P(at least 1 Quarter) = 1 − P(No Quarter)

DD
DQ
QD
QQ

$= 1 - P(2D)$

$= 1 - \frac{5}{14} = \boxed{\frac{9}{14}}$

Mar 21-7:16 AM

Total (¢)	P(Total ¢)
20¢	5/14
35¢	15/28
50¢	3/28

L1 = Total (¢), L2 = P(Total ¢)

Use 1-Var Stats with L1 & L2 to find

$\bar{x} = 31.25$

$S =$ blank

$n = 1$

VARS → 5: Statistics → 4: → χ^2 → MATH → 1: ▶Frac → Enter

$\frac{10125}{112}$

Mar 21-7:27 AM

A box has 4 Red & 6 Blue balls.

Randomly take 3 balls, No replacement.

Sample Space: RRR, RRB, RBR, RBB, BRR, BRB, BBR, BBB

$P(3\text{ Reds}) = \frac{{}_4C_3 \cdot {}_6C_0}{{}_{10}C_3} = \frac{4}{120} = \frac{1}{30}$

$P(2R \& 1B) = \frac{{}_4C_2 \cdot {}_6C_1}{{}_{10}C_3} = \frac{36}{120} = \frac{3}{10}$

$P(1R \& 2B) = \frac{{}_4C_1 \cdot {}_6C_2}{{}_{10}C_3} = \frac{60}{120} = \frac{1}{2}$

$P(3\text{ Blues}) = \frac{{}_4C_0 \cdot {}_6C_3}{{}_{10}C_3} = \frac{20}{120} = \frac{1}{6}$

$1 \div 30 + 3 \div 10 + 1 \div 2 + 1 \div 6 = 1$ ✓

$P(\text{Same Colors}) = P(RRR \text{ OR } BBB) = \frac{1}{30} + \frac{1}{6} = \frac{1}{5}$

$P(\text{different colors}) = 1 - P(\text{Same Color}) = 1 - \frac{1}{5} = \frac{4}{5}$

Mar 21-7:33 AM

P(at least 1 R) = 1 − P(No Red)

= 1 − P(BBB) = 1 − 1/6 = 5/6

P(at least 1 B) = 1 − P(No Blue)

= 1 − P(RRR)

= 1 − 1/30 = 29/30

# Red	P(# Red)
3	1/30
2	3/10
1	1/2
0	1/6

Clear all lists

#Red → L1

P(#Red) → L2

Use 1-Var Stats with L1 & L2 to find

$\bar{x} = 1.2$

S = Blank

n = 1

VARS

5:

4:

x^2

MATH

1: ▶Frac

Enter

14/25

Mar 21-7:46 AM

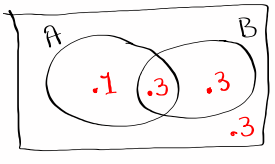
Multiplication Rule

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

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

Conditional Prob.

ex: P(A) = .4 , P(B) = .6 , P(A and B) = .3



P(A or B) = P(A) + P(B) − P(A and B) = .4 + .6 − .3 = .7

Total = 1

$P(B|A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{.3}{.4} = .75$

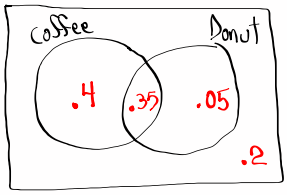
$P(A|B) = \frac{P(A \text{ and } B)}{P(B)} = \frac{.3}{.6} = .5$

Mar 21-7:55 AM

$P(\text{Coffee}) = .75$

$P(\text{Donut}) = .4$

$P(\text{Coffee and Donut}) = .35$



Total = 1

$P(\text{Coffee OR Donut}) = P(\text{Coffee}) + P(\text{Donut}) - P(\text{Coffee and Donut})$

$= .75 + .4 - .35 = \boxed{.8}$

$P(\text{Donut} \mid \text{Coffee}) = \dfrac{P(\text{Coffee and Donut})}{P(\text{Coffee})}$

$= \dfrac{.35}{.75} = \boxed{.467}$

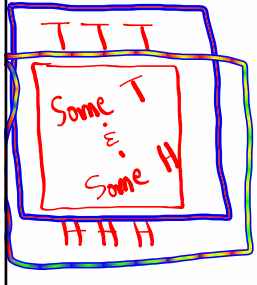
$P(\text{Coffee} \mid \text{Donut}) = \dfrac{P(\text{Coffee and Donut})}{P(\text{Donut})}$

$= \dfrac{.35}{.4} = \boxed{.875}$

Mar 21-8:03 AM

A loaded coin is tossed 3 times.

$P(T) = .2$, $P(H) = .8$



Tossing coins are independent events

$P(TTT) = (.2)(.2)(.2) = \boxed{.008}$

$P(HHH) = (.8)(.8)(.8) = \boxed{.512}$

$P(\text{at least 1 tail}) = 1 - P(\text{No T})$

$P(\text{at least 1 Head}) = 1 - P(\text{No H})$

$= 1 - P(TTT)$

$= 1 - .008$

$= \boxed{.992}$

$= 1 - P(HHH)$

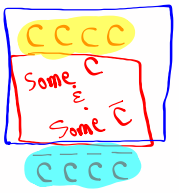
$= 1 - .512$

$= \boxed{.488}$

Mar 21-8:12 AM

You are making random guesses on a multiple-choice quiz with 4 questions. Each question has 3 choices with only one correct choice.

$P(\text{Correct}) = \frac{1}{3}$ $\quad P(\overline{\text{Correct}}) = \frac{2}{3}$



$P(\text{All Correct}) = \frac{1}{3}\cdot\frac{1}{3}\cdot\frac{1}{3}\cdot\frac{1}{3} = \boxed{\frac{1}{81}}$

$P(\text{All incorrect}) = \frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3} = \boxed{\frac{16}{81}}$

$P(\text{at least 1 Correct}) = 1 - P(\bar{C}\bar{C}\bar{C}\bar{C}) = 1 - \frac{16}{81} = \boxed{\frac{65}{81}}$

$P(\text{at least 1 incorrect}) = 1 - P(CCCC) = 1 - \frac{1}{81} = \boxed{\frac{80}{81}}$

Work on SE 13, we have a quiz on Wed. & Thursday

Mar 21-8:18 AM