- set theory
- universal set : Ω
- counting
  - ↓ scenarios
  - sampling w/ replacement (repeat digits)
  - sampling w/o replacement
  - digits drawn are ordered
  - digits drawn are unordered

- sampling → ordered, → unordered } w/ w/o replacement

- sampling k elements from a set of n

w/ replacement : n^k
w/o replacement : ${}^nP_k \rightsquigarrow n!/(n-k)!$

$\_\ \_\ \_\ \_ \leftarrow 4! = 24$

${}^3C_2 \times 2!$

3 2

← 4 boys
2 girls
a boy on either side of the girl

$6 \times \cancel{6 \times 4} = 144$

$\frac{144}{4!\,2!} = 3$

$\_\ \_\ \_\ \_$

- $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

  $\hookrightarrow = P(A)P(B)$

  $\hookrightarrow$ if independ

- percentages of independent
  use table

	a	b	total
c			
d			
total.			

- practice : PnC
  Probabilities.

"quantifying belief

↖

Bayes Theorem

- sample space prior known information is reduced due to new information

- $P(\text{Hypothesis} \mid \text{Evidence})$ → restricting our view only to possibilities where evidence holds

  $\text{Hypothesis} \downarrow H$, $\text{Evidence} \downarrow E$

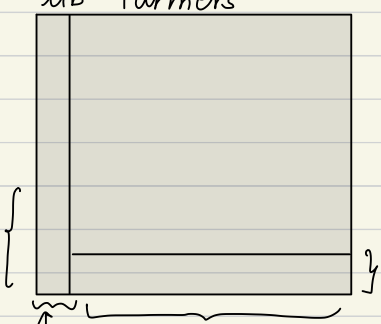
- $P(H)$ ← priori

  $P(H|E)$ ← posterior

$$P(H|E) = \frac{P(H)P(E|H)}{P(E)} = \frac{\overbrace{P(H)P(E|H)}^{x}}{\underbrace{P(H)P(E|H)}_{x} + \underbrace{P(\neg H)P(E|\neg H)}_{y}}$$

how often is H true among cases where E is true

lib farmers



$P(E|H)$ → ↳ "libs that fit desc." ↓ out of all lib, x no are meek

$P(H)$ ↳ "is a lib"

$P(\neg H)$ → "is a farmer"

← $P(E|\neg H)$ → "farmers that fit the description" ↓ out of all the farmers, y no. are meek eg. $P(g1) = 0.8$

$P(g2) = 0.5$

independent

$P(g1 \cap g2) = P(g1) \times P(g2)$

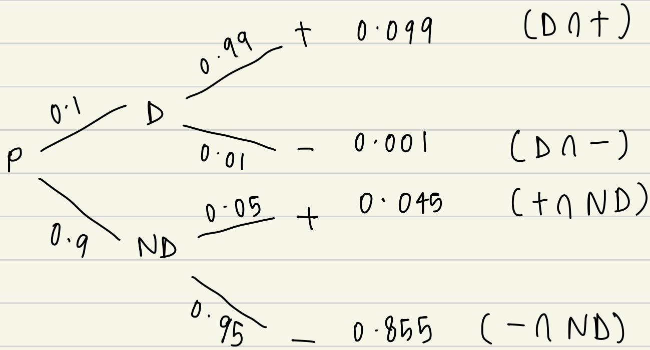
$P(g1 \cup g2) = P(g1) + P(g2) - P(g1 \cap g2)$

Khanacademy

$\cancel{26} / \cancel{38}$

$13 \quad 19$

$\frac{\cancel{26}}{\cancel{48}}$ $\frac{13}{24}$

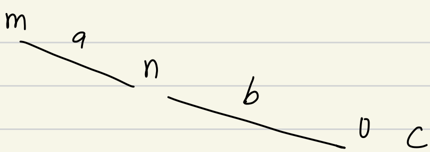


$P(+) = 0.099 + 0.045 = 0.144$

$P(-) = 0.856$

$P(D|+) = \frac{0.099}{0.144}$

$P(+|D) = \frac{0.099}{0.1} = 0.99$



$P(o|n) = b = c/a$

$5(28)$

pick 1 twice : 28^2

$(9, \text{not}) \rightarrow (12 \times 16)/28^2$

$(\text{not}, 9) \rightarrow (\text{—}\,{}''\,\text{—})$

$(9, 9) \rightarrow (12 \times 12)/28^2$

$+ \quad = 0.673$

0.4

5

$\frac{1}{4} \times \overset{0.25}{0.6}$

1/5

0.2×0.4

$P(A \text{ and } B) \rightarrow P(A \cap B)$

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

1st right

2nd wrong

SS : $(6 \times 5) \rightarrow 30$

$P(\bar{A} \text{ and } \bar{B}) = P(\bar{A} \cap \bar{B}) = P(\bar{A}) P(\bar{B})$ ∵ independent

$0.9 \times 0.9 =$

$P(A \cap B) = P(A) \cdot P(B|A)$ A → not lefty

$\frac{44}{50}$ $\frac{43}{49}$.

$P(\text{at least one}) = 1 - P(\text{none})$

$= 1 - (0.95 \times 0.95 \times 0.95)^2$

$P(>1) = 0.8$

$P(\text{want}) = 1 - P(<1\,\text{hr})$

$(0.2)^{20}$

$$\underset{1X}{(0.5)}\underset{X}{(0.5)}\underset{V}{(0.5)} \rightarrow 0.125$$

$$\begin{array}{r} 0.125 \\ +\ 0.125 \\ \hline 0.25 \end{array}$$

W	L
0.02	0.98
m	n

$0.02m + 0.98n = 0.95$

$16 \times 0.36 + 0.48 + 36 \times 0.16 = 19.2$

$$\begin{array}{r} \cancel{36} + 3.6 \\ \hline 32.4 \end{array}$$

$\sqrt{7.2}$ $\sqrt{36}$

$(1.4)^2(0.09) + (0.4)^2(0.42) + (0.6)^2(0.49)$

$(495)^2(0.01) + (5)^2(0.99)$

99990

0.6×10000

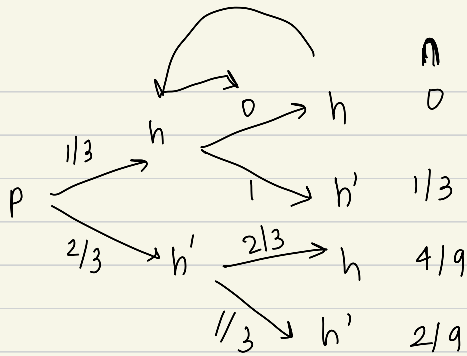
$= 6000 - 2000$

$Y = X - 1$

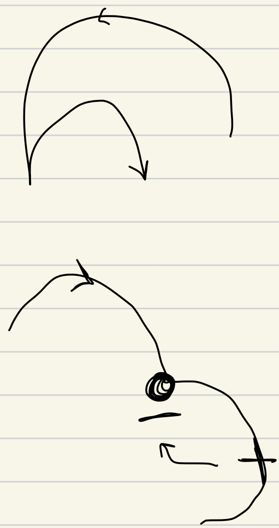
$T = 10X$

$\mu_T \rightarrow 10\mu_X = 1.2$

$\sigma_T \rightarrow 10\sigma_X = 3.8$



P
1/3
2/3
h
h'
0
1
2/3
1/3
h
h'
h
h'
0
1/3
4/9
2/9



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