

# homework\_1\_bayes

Peter Dunson

2026-01-14

Sec 1.10 Exercises 2, 5, 6, 9, 12, 16, 17, 21, 22, 23

## Problem 2

- a. Classical
- b. Subjective
- c. Subjective
- d. Classical
- e. Frequency
- f. Frequency

## Problem 5

- a. 7/30
- b. 9/30
- c. 1 flip

## Problem 6

- a. 8/20
- b. 7/20
- c. Somewhat unusual, given that 23.0 only happens once out of 20.

## Problem 9

- a.  
a - 1/5 e - 1/5 i - 1/5 o - 1/5 u - 1/5  
  
b.  
  
a - .3 e - .35 i - .2 o - .10 u - .05  
  
c. No, some vowels, like e and a, occur much more than others, like u.  
  
d.  
  
a - 61/250 = 0.244 e - 63/250 = 0.252 i - 34/250 = 0.136 o - 70/250 = 0.280 u - 22/250 = 0.088

## Problem 12

- a.  
 $S = \{(H, H, H), (H, H, T), (H, T, T), (T, T, T), (T, T, H), (T, H, H), (H, T, H), (T, H, T)\}$   
  
b.  
 $S = \{(x, y, z) \mid x, y, z \in \{A, B, C\}\}$   
  
c.  
 $S = \{(x, y, z) \mid x \in \{X_1, X_2, X_3\}, y \in \{Y_1, Y_2\}, z \in \{Z_1, Z_2\}\}$   
  
d.  
 $S = \{(X_1, X_2, X_3) \mid X_i \in \{\text{Lucky, Best Girl, Stripes, Solid, Jokerster}\}, X_1 \neq X_2 \neq X_3\}$   
  
e.  
 $S = \{(X_1, X_2) \mid X_i \in \{0, 1, 2, \dots, 9\}\}$   
  
f.  
g.  $S = \{(w, x, y, z) \mid w, x, y, z \in \{a, b, c, d\} \text{ and } w \neq x \neq y \neq z\}$   
  
h.  
  
I = make O = miss  
 $S = \{(O), (I, O), (I, I)\}$

## Problem 16

- a.  
Probably not... if this is a chess master I'd say for me:  
  
0 games: 99.9% 1 game: .0099% 2 games: .0001%  
  
b.  
  
No, the probability of a random car BEING a corvette is 10%, so red corvette would be less than 10% (unless all of the corvettes are red).  
  
c.  
  
No, the percentage who play both sports HAS to be less than the percentage that plays golf or tennis (whichever lower), so must be less than 20%.  
  
d.  
  
Yes, this is reasonable.

## Problem 17

- a. any of them! equally likely to be any number of keys
- b. none of them are least likely
- c. 1/5 for each

## Problem 21

- a.  
(J, M, P), (J, P, M), (M, P, J), (M, J, P), (P, M, J), (P, J, M)  
  
b.  
  
 $P(M) = 1/3$   
 $P(B) = 1/2$   
  
c.  
  
(M, J, P)  
(M, P, J)  
 $P(M \cap B) = 1/3$   
  
d.  
  
 $P(\bar{B}) = 1 - P(B) = 1/2$   
  
e.  
  
 $P(M \cup B) = 1/2$

## Problem 22

- a.  
 $P(F) = 45/193$   
  
b.  
  
Yes, you can't be a freshman and a junior.  
  
c.  
  
 $P(F \cup J) = 97/193$   
  
d.  
  
 $P(F \cap M) = 25/193$   
  
e.  
  
 $P(F \cup M) = 118/193$

## Problem 23

- a.  
 $S = A \cup \bar{A}$   
 $A \cap \bar{A} = \emptyset$   
  
b.  
  
 $P(S) = P(A \cup \bar{A}) = P(A) + P(\bar{A})$   
  
c.  
  
 $P(S) = 1 = P(A) + P(\bar{A})$   
  
So ...  
  
 $P(\bar{A}) = 1 - P(A)$