

Homework 3

2025-03-07

1. You read that in native Hawaiians, the probability of having blood type AB is $1/100$. What does this mean?
 - a. If you pick 100 Hawaiians randomly, the fraction of them having blood type AB will be very close to $1/100$
 - b. If you pick 100 Hawaiians randomly, exactly 1 of them will have blood type AB
 - c. If you pick 10,000 Hawaiians randomly, exactly 100 of them will have blood type AB

2. A cat is about to have 6 kittens. The sample space for counting the number of female kittens she has is
 - a. S = any number between 0 and 1
 - b. S = whole numbers 0 to 6
 - c. S = all sequences of 6 males or females by order of birth, such as FMMFFF

3. $X = \{\text{the weight of randomly selected cervids}\}$
 - Support:
 - Variable Type:

4. $X = \{\text{the time it takes to conduct a rare surgery}\}$
 - Support:
 - Variable Type:

(Problem 5) Let Z = the number of owls currently outside your home. The probability distribution of Z is given as follows:

z	0	1	2	3	4	5	6	7+
$P(Z = z)$	0.5	0.25	0.12	0.05	0.03	0.03	0.012	0.008

5a. Is this a legitimate probability distribution?

5b. Find the probability that no owls are outside your home.

5c. Find the probability that at least 2 owls are outside your home.

5d. Find $\mathbb{E}Z$

5e. Find $\mathbb{V}Z$

5f. Find σ_Z

5g. At what point are there enough owls outside your home that you're concerned? Find the probability that there are that many or more owls.

(Problem 6)

Let

$$A \equiv \{\text{Your March Madness Bracket is exactly correct}\}$$

$$B \equiv \{\text{Dean Culbertson's Bracket has K-State as the champions}\}$$

$$C \equiv \{\text{K-State isn't in the lineup for 2025}\}$$

Def

$$P(A) = 1/10^{12}, \quad P(B) = 0.8, \quad P(C) = 0.95$$

6a. Find $P(A \cup B)$

6b. Find $P(B \cap C)$

6c. Find $P(A|B)$

6d. Find $P(B|C)$