

STAT 511: Summer 2018 – Quiz 1

Name:

Class Time:

1. If a fair coin is independently flipped 6 times, what is the probability that there is exactly one head?

$$\text{Total \# outcomes} = 2^6$$

$$\text{\# outcomes with exactly one head} = \text{\# ways to choose one flip (for the head) out of 6 flips} = 6$$

Outcomes are equally likely as the coin is fair.

$$\therefore P(\text{Exactly one head}) = \frac{6}{2^6} = 0.09375$$

2. A car safety institute observes that 12% of cars on the road are manufactured by Honda. They also observe that 96% of Honda cars are classified as "safe" at the time of inspection, whereas only 72% of all cars (regardless of brand) are classified as "safe". A car randomly chosen on the road was inspected and classified as "safe". What is the probability that it is a Honda?

Let us denote the events that a randomly chosen car is Honda and Safe as H and S respectively.

$$\therefore P(H) = 0.12,$$

$$P(S|H) = 0.96$$

$$\text{and } P(S) = 0.72.$$

$$\begin{aligned} \text{Now, } P(H|S) &= \frac{P(H \cap S)}{P(S)} = \frac{P(S|H) P(H)}{P(S)} \\ &= \frac{0.96 \times 0.12}{0.72} \\ &= 0.16 \end{aligned}$$