

Quiz 2

STAT 381, APPLIED STATISTICAL METHODS I, SPRING 2015

NAME: *Solutions*

Problem 1. For two *independent* events A and B , $P(A) = .5$ and $P(A \cap B) = .3$.

a. (2 points) Find $P(B)$.

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

$$P(B) = .6 \quad \Rightarrow \quad .3 = .5 \cdot P(B)$$

b. (2 points) Find $P(A \cup B)$.

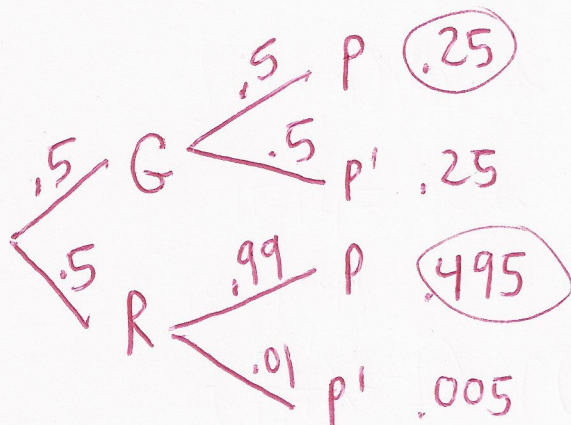
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= .5 + .6 - .3 = .8$$

c. (1 point) Find $P((A \cup B)')$.

$$P((A \cup B)') = 1 - P(A \cup B) = 1 - .8 = .2$$

Problem 2. (5 points) I have two indistinguishable peppers: A **ghost pepper** and a **reaper pepper**. Ghost peppers make me pass out 50% of the time, but reaper peppers make me pass out 99% of the time. I pick one (at random), eat it and pass out. What is the probability it was the ghost pepper? *Hint: Use a tree diagram or Bayes' Rule.*



$$P(G|P) = \frac{P(G \cap P)}{P(P)} = \frac{.25}{.25 + .495}$$

$$= \frac{50}{149}$$

$$\approx .3356$$

OR

$$P(G|P) = \frac{P(G) \cdot P(P|G)}{P(G) \cdot P(P|G) + P(R) \cdot P(P|R)}$$
~~$$= \frac{(.5)(.5)}{(.5)(.5) + (.5)(.99)}$$~~

$$= \frac{(.5)(.5)}{(.5)(.5) + (.5)(.99)}$$

$$= \frac{50}{149} \approx .3356$$