
Probability Theory: Activity 5aa

Name: _____

A good friend of yours is convinced that his presence is required for his favorite basketball team to win. He shows you the following chart:

Overall	Friend	No Friend	Total
Win	13	9	22
Loss	10	22	32
Total	23	31	54

“Look!” your friend says, “when I am at the game, we win more than half our games. But when I’m not at the game, we win less than half. Clearly I need to attend all the game from now on!”

1. Find the probability of a win, given your friend is present: $P(W|F)$.
2. Find the probability of a win, given your friend is not present: $P(W|F^c)$.
3. Find the probability of a win: $P(W)$.
4. Do you think that the probability of winning is independent of your friend’s presence?

Well, this looks awfully strange. You can’t believe that your friend really makes a difference sitting in the stands. You recall that your (otherwise not very good team) has one really strong amazing star player who your friend really loves, but that sometimes that player is hurt or needs a rest, and so doesn’t play. Maybe this has something to do with it. So you ask your friend, how many games did he attend and see that star? He gives you the following tables:

Overall	Friend	No Friend	Total
Win	12	4	16
Loss	6	2	18
Total	18	6	24
With Star			

Overall	Friend	No Friend	Total
Win	1	5	6
Loss	4	20	24
Total	5	25	30
Without Star			

5. Now, you wonder, what is the probability of a win given the star and your friend's presence? That is, what is $P(W|F \cap S)$?

6. What is the probability of a win given the star and your friend's absence? That is, what is $P(W|F^c \cap S)$?

7. Now, what is the probability of a win given the star? What is $P(W|S)$?

8. Similarly, what's the probability of winning given that the team doesn't have the Star player and your friend is absent? That is, what is $P(W|S^c \cap F^c)$?

9. What is the probability of of winning given that your friend is present, but the team doesn't have the Star player? That is, what is $P(W|S^c \cap F)$?

10. What is the probability of winning given that the star player is absent? That is, what is $P(W|S^c)$?

11. What do you think is causing your friend to think that his presence effects the team?