HW2

ID: 38

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2.2 Roulette wheel

1. I am not confident of my answer to part (b). Because if it can fall into red for 300 consecutive times, there probably be something wrong with the roulette. So the probability of the fact that the ball falling into red slot is greater than .

2.4 Backgammon

Obviously, what number you get on two dices are independent event. In one row, the probability of getting 6 of one dice is , the probability that you get two 6s is . Similarly, the probability of getting 3 of one dice is and the probability that you get two 3s is .

When you begin your second row, the probability of getting two 6s is still and so does two 3s. Therefore, this is a fair game.

2.5 Coin flips

The probability of getting tail is . The probability of getting head is . Each time when you flip the coin, it is an independent event.

1. Unless you get all heads for all 10 times, you must get at least one tails. So, =

2.6 Dice rolls

2. The following cases satisfy “a sum of 5: (1,4), (2,3), (3,2), (4,1). So
3. The following cases satisfy “a sum of 12”: (6,6). So

2.8 Poverty and language

1. No. These two event can happen at the same time.

Both

4.2%

1. Pr(below poverty line and only English) = 14.6%- 4.2% = 10.4%
2. Pr(below poverty line or other language) = 14.6%+20.7% - 4.2% = 31.1%
3. Pr(above poverty line and only English) = 1 – 31.3% = 68.9%
4. From the Venn diagram, we can say that these two event are dependent. Here is the proof:

Here let A represent “below the poverty line” and B represent “foreign language”

Pr(A) = 14.6% Pr(B) = 20.7%

If the A and B are independent, Pr(AB) = Pr(A) \* Pr(B) = 3.02%

However from d), we know Pr(below poverty line or other language) = 31.1%, which is not equal to 3.02%.

Therefore, we can say that these two events are not independent.

2.10 Guessing on an exam

1. Pr(the 5th question is first right) =
2. Pr(All right) = =
3. Pr(At least one right) = 1- Pr(All wrong) =

2.12 School absences

1. Pr(No miss) = 1 – Pr(Once) – Pr(Twice) – Pr(three more) = 0.32
2. Pr(No more than once) = Pr(No miss) + Pr(once\_ = 0.32+ 0.25 = 0.57
3. Pr(At least one miss) = 1- Pr(No miss) = 1 – 0.32 = 0.68
4. If two kids miss school or not are independent, we can say that

Pr(Neither miss any school) = Pr(No miss ) \* Pr(No miss) = 0.32 \* 0.32 = 0.102

1. If two kids miss school or not are independent, we can say that

Pr(Both miss some school) = Pr(At least one miss) \* Pr(At least one miss) = 0.68 \* 0.68 = 0.4624

1. No, it is not very reasonable. For example, one kid may get infected because of his brother/sister’s illness, and then they may miss school at the same time.

2.14 Health coverage, frequencies

1. Pr(Excellent health and No coverage) =
2. Pr(Excellent health or No coverage) = = 0.336

2.16 PB & J.

Here let ,,

2.18 Health coverage, relative frequencies

Here let

1. No. There is an intersection of these two event.
2. = 0.2329
3. From the table we know that

Although is not exactly equal to , the difference between two of them are relatively small. Therefore, we can say these two event appears to be independent.

2.22 Predisposition for thrombosis

Here let , 𝐵

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Therefore, the probability that a randomly selected person who test positive for the predisposition by the test actually has the predisposition is 0.605

2.24 Exit poll

Here let

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Therefore, the probability that he voted in favor of Scott Walker is 0.4867

2.26 Twins

Here let

Therefore, the probability that they are identical is 0.4615