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IS606 Assignment 2

* Practice: 2.5, 2.7, 2.19, 2.29, 2.43
* Graded: 2.6, 2.8, 2.20, 2.30, 2.38, 2.44

**2.6**

a: for 1: 0

b: for 5: (1/4)(4/1)(2/3)(3/2) = 4/36 = 1/9

c: for 12: (6/6) = 1/36

**2.8**

a. Both living below poverty line and speaking foreign language can apply to the same person, so they are not mutually exclusive or disjoint

b.

Under Poverty Line

both

Foreign language

20.7

14.6

4.2

c. P(below poverty and only English) = 14.6 – 4.2 = 10.4% live below poverty line and speak English

d. P(poverty or Foreign language) = 20.7 + 14.6 = 35.3%

e. P(above poverty and only English) = 1 – (20.7 + 4.2 + 14.6) = 1 – 39.5% = 60.5%

f. No, they are not independent, often people who speak only a foreign language are first generation immigrants and they may have trouble finding a job

**2.20**

a. P(MBlue or FBlue) = (108/204) + (114/204) – (78/204) = **.706**

b. P(FBlue| MBlue) = 78/114 = **.684**

c. P(FBlue | MBrown) = 19/54 = **.352**, P(FBlue | MGreen) = 11/36 = **.306**

d. Since the probably of a double blue eyed coupe is nearly twice the probably of a male with green or brown eyes partnering a blue eyed female, the data appears to suggest that there is an association between genotypes and partnering and they are likely dependent on some level

**2.30**

a. P(Hardcover then paperback fiction) w/o Replacement = 28/95 \* 59/94 = **.185**

b. P(Fiction then hardcover) w/o Replacement=

(P(Hardcover|Hardcover Fiction) + P(Hardcover|Softcover Fiction) =

((13/95)\*(27/94)) + ((59/95)\*( 28/94)) = **.224**

c. P(Fiction then hardcover) w/Replacement = (72/95)(28/95) = **.223**

d. the replacement amount is very small, only 1 book out of 95

**2.38**

$25 for first / $35 for second

54% have no checked luggage, 34% have one checked, 12% two checked, 0% for >2

a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| i | 0 | 1 | 2 | Total |
| xi | $0 | $25 | $60 |  |
| P(X = xi) | .54 | .34 | .12 |  |
| xi \* P(X = xi) | 0 | 8.5 | 7.2 | 15.7 |
| xi – u | -15.7 | 9.3 | 44.3 |  |
| (xi – u)^2 | 246.49 | 86.49 | 1962.49 |  |
| (xi – u)^2 \* (P(X=xi)) | 133.1 | 29.4 | 235.5 | Var = 398.01,  SD = 19.95 |

b. 120 passengers \* $15.7 = $1884

Standard deviation = SQRT((120^2)(398.01)) = $2394.02

Assumptions: each of the traveler’s baggage needs are independent of others, which is unlikely, as many people fly in groups and share baggage space

**2.44**

a. It appears to be a unimodal and symmetric distribution

b. Less than 50K = 2.2 + 4.7 + 15.8 + 18.3 + 21.2 = **62.2**

c. Assuming the gender differences are spread evenly through the distribution (they are not in real life):

P(Female and <50K) = .41 \* .622 = **.255**

d. P(<50K|Female) = 71.8%

P(Female and <50K) = .41 \* .718 = **.294**, which is more than **.255** because gender differences not spread evenly throughout the distribute, contradicting the assumption I had to make earlier