Taylor Watanabe (Whittier I.D: 20594796)
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Homework #3
Math 080

Chapter 3: 67, 82, 84, 85, 86

67. a) Given the probability of rain on a Saturday and Sunday (P(Saturday)=0.6, P(Sunday)=0.7) the probability of the chance of rain on the weekend can be determined by P(Sat. AND Sun.) = P(Sat.) * P(Sun.) = 0.42, with P(Sat. THEN Sun.) = P(Sat.) + P(Sun.) – P(Sat. AND Sun.) = 0.6 + 0.7 – 0.42 = 0.88. The probability it will rain on that weekend is 88%. The incorrect statement above states a 130% chance of rain on the weekend and thus statistically impossible as you cannot have a probability greater than 100%.

b) A successful hit includes a hit resulting in a home run, thus you will have at least as many successful hits as you do home runs as a home run is classified as a successful hit.

82. a) Sample Space: **S = {0,00,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,28,29,30,31,32,33,34,35,36.}**

b) P(red) = 18/38 = **0.47**

c) P(-1st 12-) = 12/38 = **0.32**

d) P(even) = 18/38 = **0.47**

e) No, you have (0) and (00) plus 1-36 within the same sample space.

f) Mutually exclusive event: B**lack/Red**

g) They are **not independent** as the probability of events even and 1st dozen is equal to 0.5 while the probability of an even event is equal to 0.47. 0.5 ≠ 0.47.

84. a) P(red) = P(black) = 18/38 = 0.47; thus, P(red OR black) = 36/38 = **0.95**

b) P(one of a dozen groups) = 12/38 = **0.32**

c) P(betting on the large range of number from 1 to 18) = 18/38 = **0.47**

d) P(betting on the range of numbers 19-36) = 18/38 = **0.47**

e) P(column bet) = 12/38 = **0.32**

f) P(even) = P(odd) = 18/38 = 0.47; thus, P(even OR odd) = 36/38 = **0.95**

85. a) Sample space: **{$Green_1$, $Green_2$, $Green_3$, $Green_4$, $Green_5$, $Yellow_1$, $Yellow_2$, $Yellow_3$}**

b) P(G) = 5/8 = **0.63**

c) P(G | E) = 2/3 = **0.67**

d) P(G AND E) = 2/8 = **0.25**

e) P(G OR E) = 6/8 = **0.75**

f) Green and Yellow are **not mutually exclusive** because P(G AND E) ≠ 0.

86. a) Sample space: of two dice (Dice A, Dice B) **S = {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), …, (6,5),(6,6)}**

b) P(A) = $\frac{\text{number of outcomes where either 3 or 4 is rolled first}}{\text{Total number of outcomes}}$ = 6/36 = **0.17**

c) P(B) = $\frac{\text{number of outcomes where the sum of the two dices is at most 7}}{Total\ number\ of\ outcomes}$ = 21/36 = **0.58**

d) P(A|B) is when either a 3 or 4 is rolled on the first roll, then an even number is rolled on the second roll, such that the sum of the two rolls equals at most 7.

P(A|B) = $\frac{P(A\ AND\ B)}{P(B)} = \frac{3/36}{21/36}$ = **0.14**

e) Event A and B are **not mutually exclusive**. Two events are mutually exclusive when the P(A AND B) equal zero as they are events that do not occur simultaneously. P(A AND B) for this problem was calculated to be 0.083 and thus not mutually exclusive.

f) Event A and B are **not independent events**. In problem (d) above, P(A|B) was calculated to equal 0.14 and for two events to be independent, P(A|B) = P(A). In this problem, P(A) = 0.17 which does not equal the calculated P(A|B) of 0.14.