Problem Set #8

Friday, September 30, 2022 10:00 AM

1. 6 classes + 2 free periods
    a. Chance of both being in the same day: 1/2
    b. How many outcomes: nCr(8, 2)=28
        i. 7+6+5+4+3+2+1=28
        ii. AB, AC, AD, AE, AF, AG, AH, BC, BD, BE, BF, BG, BH, CD, CE, CF, CG, CH, DE, DF, DG, DH, EF, EG, EH, FG, FH, GH
2. Sample with or without replacement
    a. Flip a coin: with replacement
    b. Roll a die: with replacement
    c. Sample population: with replacement (because people can have the same opinion so that option is not remove)
    d. Combinations of 7 shirts, 4 shorts, and 3 shoes: with replacement because you can use that for multiple combinations
    e. Choosing shirts for school days: without replacement
    f. Choosing donuts: without replacement
    g. My own example: In a spinny wheel, there are 5 different options. Each time one is chosen, it disappears from the wheel.
3. Draw 2 cards, C_1 and C_2
    a. $P(C_1 = Queen) = \frac{4}{52} = \frac{1}{13}$
    b. $P(C_2 = Queen) = \frac{4}{51} * \frac{12}{13} + \frac{3}{51} * \frac{1}{13} = \frac{48}{663} + \frac{3}{663} = \frac{51}{663} = \frac{1}{13}$
    c. If you look above, I combined the probabilities of it being a queen and it not being a queen. If we knew if one queen is already removed or not, the chance would definitely be different.
4. Draw 3 cards from standard 52 card deck
    a. $\frac{1}{4} * \frac{12}{51} * \frac{39}{50} + \frac{3}{4} * \frac{13}{51} * \frac{12}{50} + \frac{1}{4} * \frac{39}{51} * \frac{12}{50} = \frac{1404}{10200} = \frac{117}{850} \approx 0.1376$
    b. $\frac{1}{4} * \frac{12}{51} * \frac{11}{50} = \frac{132}{10200} = \frac{33}{2550} \approx 0.0129$
    c. $\frac{1}{4} * \frac{12}{51} * \frac{39}{50} + \frac{3}{4} * \frac{13}{51} * \frac{12}{50} + \frac{1}{4} * \frac{39}{51} * \frac{12}{50} = \frac{1404}{10200} = \frac{117}{850} \approx 0.1376$
    d. $\frac{1}{4} * \frac{12}{51} * \frac{11}{50} = \frac{132}{10200} = \frac{11}{850} \approx 0.0129$