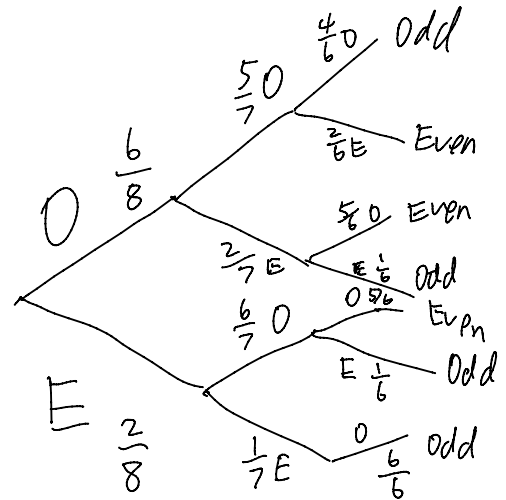
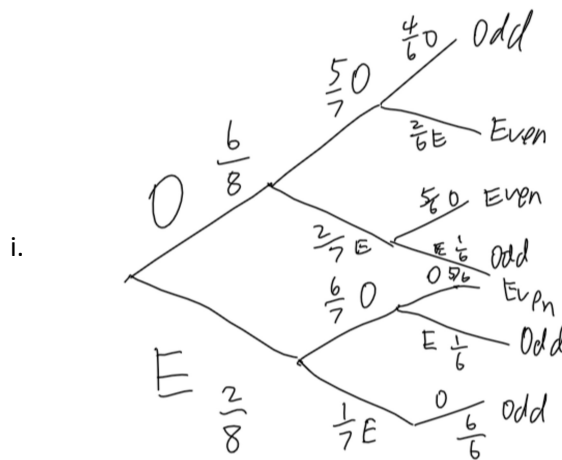


# Problem Set #9

Tuesday, October 4, 2022 9:03 AM

1. 8 cards: {2, 3, 3, 4, 5, 5, 5, 5}, draw 3 at random
  - a. 6 odd cards, 2 even cards, want odd sum



- ii.  $\frac{6}{8} \cdot \frac{5}{7} \cdot \frac{4}{6} + \frac{6}{8} \cdot \frac{2}{7} \cdot \frac{1}{6} + \frac{2}{8} \cdot \frac{6}{7} \cdot \frac{1}{6} + \frac{2}{8} \cdot \frac{1}{7} = 0.4643$
  - b. 7 different endpoints (it would be 8 but there's only 2 evens). They are not all the same since I don't take into account the different numbers but only whether they were odd and even. Probabilities are also different since there are more odds than evens.
2. Texas Hold 'em, I have 3 of diamonds and 10 of diamonds, flop shows 4 of clubs, A of clubs, and J of diamonds
  - a. Chance of getting flush (assuming 1 deck)
    - i.  $\frac{(13-3)}{(52-5)} = 0.2128$
    - b. Highest card for me is Q so need the chance that they have a flush and that they need to have a king of diamonds since I also have J and 10
      - i.  $\frac{1}{45} \cdot 2 = \frac{2}{45}$
      - ii.  $1 - \frac{2}{45} = \frac{43}{45}$
    - c. With 2 other people, there's the chance that the 2nd person has it, so the chance would be:  $\frac{41}{45}$
3. Randomly get a donut, 3 glazed, 2 maple, 3 old-fashioned, 2 sprinkles, and 2 peanut. Retry if sprinkles
  - a.  $\frac{3}{12} + \frac{2}{12} \cdot \frac{3}{12} = \frac{6}{24} + \frac{1}{24} = \frac{7}{24} \approx 0.2917$
  - b.  $\frac{3}{12} \left( \frac{2}{11} + \frac{2}{11} \cdot \frac{2}{11} \right) + \frac{2}{12} \left( \frac{3}{11} + \frac{1}{11} \cdot \frac{3}{11} \right) + \frac{7}{12} \left( \frac{3}{11} + \frac{2}{11} \cdot \frac{3}{11} \right) = 0.2913$
4. 8 total donuts, take 4
  - a.  $nPr(8, 4) = \frac{8!}{(8-4)!} = 8 \cdot 7 \cdot 6 \cdot 5 = 1680$
  - b.  $nCr(8, 4) = \frac{8!}{4! (8-4)!} = \frac{8 \cdot 7 \cdot 6 \cdot 5}{4 \cdot 3 \cdot 2} = 7 \cdot 2 \cdot 5 = 70$