Statistics for the Life Sciences

Math 20340 Section 01, Fall 2009

Homework 1 Solutions

- **4.1**:
  - **a**: Simple events $1, 2, 3, 4, 5, 6$
  - **b**: A: $\{2\}$; B: $\{2, 4, 6\}$; C: $\{3, 4, 5, 6\}$; D: $\{2\}$; E: $\{2, 4, 6\}$; F: $\emptyset$
  - **c**: Each one should have probability $1/6$
  - **d**: A: $1/6$; B: $1/2$; C: $2/3$; D: $1/6$; E: $1/2$; F: $\emptyset$
- **4.4**:
  - **a**: $.21$
  - **b**: $.91$
- **4.6**:
  - **a**: Experiment in two stages
  - **b**: There are 4 simple events: (Male, preschool), (Female, preschool), (Male, no preschool), (Female, no preschool),
  - **c**: In the order listed above: $8/25$, $9/25$, $6/25$, $2/25$
  - **d**: Male: $14/25$; $2/25$
- **4.9**:
  - **a**: $.58$
  - **b**: $.14$
  - **c**: $.46$
- **4.11**:
  - **a**: Three stage experiment; in each stage an answer, either "M" or "F", is recorded
  - **b**: S consists of eight simple events: MMM, MMF, MFM, FMM, MFF, FMF, FFM, FFF
  - **c**: $1/8$ each

  - **d**: There are three simple events in which there is only one man: MFF, FMF, FFM; so probability is $3/8$
  - **d**: There is only one simple event in which all three are women: FFF; so probability is $1/8$

- **4.13**:

  - **a**: The three symbols A, B, C are being put in order
  - **b**: S consists of six simple events: ABC, ACB, BAC, BCA, CAB, CBA
  - **c**: We should assign probability $1/6$ to each simple event. There are 2 in which A is on top, so the probability of that is $2/6 = 1/3$. Similarly, probability of A at bottom is $1/3$

- **4.16**: NEED

  - **a**: There are four simple events: "guided", "no part", "as is", "no opinion"
  - **b**: Not equally likely: probability of "guided" is .36, of "no part" is .13, of "as is" is .46, and of "no opinion" is .05,
  - **c**: There are two simple events that fit this event: "guided" and "as is", so probability is $.36 + .46 = .82$
  - **d**: .13 (only one good simple event)

- **4.19**:

  - **a**: $5.4.3 = 60$
  - **b**: $10.9.8.7.6.5.4.3.2 = 3,628,800$
  - **c**: $6.5.4.3.2.1 = 720$
  - **d**: 20

- **4.20**:

  - **a**: $5!/3!2! = 10$
  - **b**: $10!/9!1! = 10$
  - **c**: $6!/6!0! = 1$
  - **d**: $20!/1!19! = 20$

- **4.26**: $4.12.4 = 192$
- **4.33**: $C_{10}^{90} \approx 5.7 \times 10^{12}$ (order doesn't matter)
- **4.34**:

  - **a**: $C_5^2 = 10$ (order doesn't matter)
  - **b**: Since committees have only two members, there is only one that has Smith *and* Jones; so probability is $1/10$.