

# Mathematics for Political Science

## Day 5: Probability & Looking Ahead

### Exercise Solutions

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1.  $36 * 35 * 5 * 12 * 13 * 6 = 5896800$

2.

1. {Reagan, Bush31, Dole, Bush43, McCain, Perot, Nader}

2. (graph - all the area outside the circle around L)

3. U, V

4.  $[0, .7]$

5. {1,2,3,4,5,6}

6.  $(.7, .8)$

7. (graph - the region where circles L and M overlap)

8.  $\{\emptyset\}$

3.  $A \cup A = A$  and  $A \cap A = A$ . The intersection or union of any set with itself is itself.

4.

2	$\frac{1}{16}$
3	$\frac{2}{16} = \frac{1}{8}$
4	$\frac{3}{16}$
5	$\frac{4}{16} = \frac{1}{4}$
6	$\frac{5}{16}$
7	$\frac{6}{16} = \frac{3}{8}$
8	$\frac{7}{16}$

5.

1.  $\left(\frac{1}{2}\right)^6 = \frac{1}{64}$

2.  $\binom{10}{3} \left(\frac{3}{13}\right)^3 \left(\frac{10}{13}\right)^7 \approx .235$

3.  $1 - \binom{9}{3} \binom{6}{3} \left(\frac{1}{6}\right)^9 \approx .99983$

6.

1. .53

2.  $\approx .444$

3.  $\approx .396$

4.  $\approx .333$

5.  $\approx .595$

7.  $\frac{2}{11}$

8.

1.  $p(A|\text{red}) = \frac{1}{7} \approx .143$ ,  $p(B|\text{red}) = \frac{6}{7} \approx .857$

2.  $p(A|\text{blue}, \text{blue}) \approx .835$ ,  $p(B|\text{blue}, \text{blue}) \approx .165$   
 $p(A|\text{blue}, \text{blue}, \text{blue}) \approx .919$ ,  $p(B|\text{blue}, \text{blue}) \approx .081$ .

3.  $p(A|\text{red}) \approx .310$

9.  $\frac{7}{31} \approx .226$