

# Mathematics for Political Science

## Exercise Solution 3: Probability

August 23<sup>rd</sup>, 2019

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1.  $36 * 35 * 5 * 12 * 13 * 6 = 5896800$
  2. (a) {Reagan, Bush31, Dole, Bush43, McCain, Romney, HRC, Perot, Nader}  
(b) (graph - all the area outside the circle around L)  
(c) U, V  
(d)  $[0, .7]$   
(e) {1,2,3,4,5,6}  
(f)  $(.7, .8)$   
(g) (graph - the region where circles L and M overlap)  
(h)  $\{\emptyset\}$
  3.  $A \cup A = A$  and  $A \cap A = A$ . The intersection or union of any set with itself is itself.

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	$\frac{7}{16}$

4. (a)  $\frac{3}{16}$   
(b)  $\frac{4}{16} = \frac{1}{4}$   
(c)  $\frac{5}{16}$   
(d)  $\frac{6}{16} = \frac{3}{8}$   
(e)  $\frac{7}{16}$
5. (a)  $\left(\frac{1}{2}\right)^6 = \frac{1}{64}$   
(b)  $\binom{10}{3} \left(\frac{3}{13}\right)^3 \left(\frac{10}{13}\right)^7 \approx .235$   
(c)  $1 - \binom{9}{3} \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^6 \approx .99983$
6. (a) .53  
(b)  $\approx .444$   
(c)  $\approx .396$   
(d)  $\approx .333$   
(e)  $\approx .595$
7.  $\frac{2}{11}$
8. (a)  $p(A|\text{red}) = \frac{1}{7} \approx .143$ ,  $p(B|\text{red}) = \frac{6}{7} \approx .857$   
(b)  $p(A|\text{blue, blue}) \approx .835$ ,  $p(B|\text{blue, blue}) \approx .165$   
 $p(A|\text{blue, blue, blue}) \approx .919$ ,  $p(B|\text{blue, blue}) \approx .081$ .  
(c)  $p(A|\text{red}) \approx .310$
9.  $\frac{7}{31} \approx .226$

Thanks to Sarah Bouchat, Michael DeCrescenzo, Brad Jones, and Dave Ohls for past years' materials.