Homework 14

9.2 #11

a. * The most efficient number of ways to accomplish the entire operation is:

$2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2=2^8$
$=256$

b. There are 2^5 number of possible operations

- The length 8 that begins with three zeros is

$2^5=32$

c. There are 2^6 ways to preform the entire operation

- The length 8 starts with 1 and ends with 1

$2^6=64$

9.3 #12

a. The word theory is 6 letters,

$P(6,6)=6!=720$

b. * There are 5 possibilities of blocking 2 places:

$5\times P(2,2)\times P(4,4)$
$=5\times2\times4!$
$=5\times2\times24$
$=240$

9.4 #13

- If the seventh boot is choosen then that must be the pair to any pair that had been picked
- 7 boots are picked
- 7 books are choosen from the pile of six to make certain one pair is choosen

9.5 #9

a. # of committees that can be of size 6

$\binom{40}{6}=\frac{40!}{6!(40-6)!}=\frac{40!}{6!\times34!}$

$=\frac{40\times39\times38\times37\times36\times35\times34}{6!\times34!}$

$=2\times39\times38\times37\times35=3838380$

b. $\binom{24}{3}\binom{16}{3}+\binom{24}{4}\binom{16}{2}+\binom{24}{6}\binom{16}{0}=3,223,220$

9.6 #13

a. Total Selections $=\binom{20+6-1}{20}=\binom{25}{20}=53130$

* The different selections of pastries are 53130

b. Total Selections $=\binom{17+6-1}{17}=\binom{22}{17}=26334$

* The different selections of pastries when three eclairs are present is 26334

c. * Total ways $=53130-26334=26796$

- different selections of 20 pastries when two eclairs are the maximum is 26796

9.7 #30

* $(2x+3)^{10}=\sum_{k=0}^{10}\binom{10}{k}(2x)^{10-k}(3)^k$

$=\binom{10}{0}(2x)^{10}(3)^0+\binom{10}{1}(2x)^9(3)^1+\binom{10}{2}(2x)^8(3)^2+\ldots\binom{10}{10}(3)^{10}$

- The coefficient of x^7 is $\binom{10}{3}(2)^7(3)^3=414,720$

9.8 #9

a. $P(A\cup B)=P(A)+P(B)-P(A\cap B)$
$=0.4+0.5-0.2=0.7$

b. $P(C)=P(S-(A\cup B))$
$P(C)=P((A\cup B)^c)$
$=1-P(A\cup B)$
$=1-0.7=.3$

c. $P(A^c)=1-P(A)$
$=1-0.4=.6$

d. $P(A^c\cap B^c)=P(A\cup B)^c$
$=1-P(A\cup B)$
$=1-0.7=.3$

e. $P(A^c\cup B^c)=P(A\cap B)^c$
$=1-P(A\cap B)$
$=1-0.2$
$=.8$

f. $P(B^c\cap C)=P(B^c\cap(A\cup B)^c)$
$=P(B^c\cap(A^c\cap B^c))$ - Demorgan
$=P(B\cap A^c\cap B^c)$ - Associative
$=P(A^c\cap B^c)$ - identity
$=P((A\cup B)^c)$
$=1-P(A\cup B)$
$=1-0.7=.3$

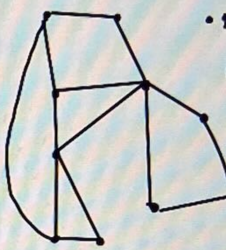
9.9 #13

a. $P(G|U_1)=\frac{25}{35}$

$P(G|U_2)=\frac{15}{7}$

$P(G)=P(G|U_1)\times P(U_1)+P(G|U_2)\times P(U_2)$
$=\frac{25}{35}\times.4+\frac{15}{37}\times.6$
$\approx0.2857+.2432=.5289\rightarrow$ if ball is green 52.9%

10.1 #13



- The graph does not contain a Euler circuit because of nodes v_1, v_7, v_8 and v_9 have odd positive degrees

10.2 #20

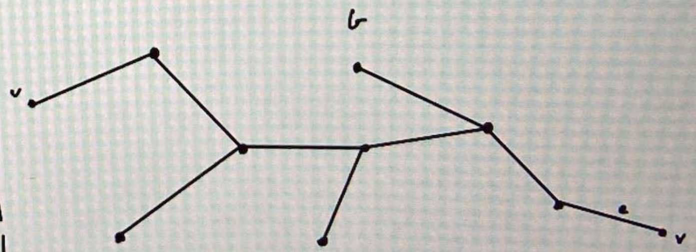
a. The # of walks of length 2 from v_2 to v_3 is 2.

b. The # of walks of length 2 from v_3 to v_4 is 3.

c. The # of walks of length 3 from v_1 to v_4 is 6.

d. The # of walks of length 3 from v_2 to v_3 is 17.

10.4 #3



* The number of edges in graph G is equal

$n_1-1+n_2-1+1=n_1+n_2-1$
$=n-1$

* The total degree of a tree with n vertices is $2n-2$.

10.4 #23

* The total # of possible edges is $9-1=8$
* a connected graph having nine vertices cannot be a tree, a connected graph is a tree cannot have non-trivial circuit.