MATH 330 HW 5 KEY

1. _ _ _ | _ _ _ _

a)

	A						
26	1	26	10	10	10	10	$26^2 \times 10^4$

b)

			1					
26	26	26	1	10	10	10	$26^3 \times 10^3$	Sum
26	26	26	9	1	10	10	$26^3 \times 9 \times 10^2$	
26	26	26	9	9	1	10	$26^3 \times 9^2 \times 10$	
26	26	26	9	9	9	1	$26^3 \times 9^3$	60,443,864

c) 2 4 6 8 has 4! permutations

26 26 26 4! $26^3 \times 4!$

2. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

a) .0 0 0 0 1

$= 2^{-24}$

b) .1 1 1 1 1 1 1 1 1 1

$$= \sum_{K=1}^{24} 2^{-K} = 2^{-1} \sum_{K=0}^{23} 2^{-K}$$

$$= 2^{-1} \frac{1-2^{-24}}{1-2^{-1}} = 1-2^{-24}$$

c) 2 2 2 2 2 2 2 2 2 2

2^{24} CHOICES OF 0,1

$= 2^4 (2^{10})^2 \approx 16 \times 10^6$

d) SEE EXCEL SPREADSHEET

3. H C F M O O P

a) 1 2 3 4 5 6 7

$$C_0^7 + C_1^7 + C_2^7 + C_3^7 + C_4^7 + C_5^7 + C_6^7 + C_7^7 = 2^7$$

$2^7/52 \approx 2.5$

b) $C_3^7 = \frac{7!}{4!3!} = 35$ $\quad 35/52 \approx 0.67$

c) Ch/No M. $C_0^5 + C_1^5 + C_2^5 + C_3^5 + C_4^5 + C_5^5 = 2^5$

M/No C. Same 2^5

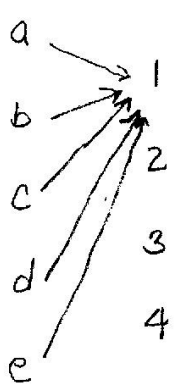
M and C Same 2^5

$3 \cdot 2^5 = 96$

$96/52 = 24/13$

≈ 1.86

4. a)



$f(a)=1, f(b)=1, f(c)=1, f(d)=1, f(e)=1$

a	b	c	d	e	
4	4	4	4	4	4^5

b)

A	B	
$\overline{5}$	$\overline{4}$	20

c)

c →	1	2	3	4		4	(c,2)
2 →	a	b	c	d	e	5	(c,2)

5. (a) M I S S I S S I P P I

$$C_4^{11} C_4^{7} C_2^{3} = \frac{11!}{7!\,4!} \frac{7!}{3!\,4!} \frac{3!}{1!\,2!}$$

$$= \frac{11!}{4!\,4!\,2!}$$

(b) SEE EXCEL SPREADSHEET