Math 100:11 Assignment 5 (Optional)
Winter 2012

11.1 2, 4, 56 11.2 40, 50, 56 11.3 20, 24, 34, 42, 50

11.4 42, 46 11.5 18, 26, 30

Section 11.1

2 N = {Andy, Bill, (Cathy), David, (Evelyn)} = {A, B, C, D, E}

elect a president & treasurer if president must be female

$\underset{\text{president}}{2} \quad \underset{\text{treasurer}}{4} = 8$ /2

or list:

CA	EA
CB	EB
CD	EC
CE	ED

note that CE ≠ EC because order matters

4. President, secretary, treasurer pres & treas. must be women

$\underset{\text{pres}}{2} \quad \underset{t}{1} \quad \underset{\text{sec}}{3} = 6$ /2

list

CEA	ECA
CEB	ECB
CED	ECD

56 How many 3 digit numbers have sums equal to 22?

possible digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,

numbers that add to 22

9+9+4	8+8+6
9+8+5	8+7+7
9+7+6	~~7+7+8~~
	~~7+6+9~~

(2)

list all possible

994	985	976	886	877
949	958	967	868	787
499	895	796	688	877
	859	769		
	598	697		
	589	679		

/2

total = 3+6+6+3+3 = 21

Section 11.2 40, 50, 56

40 Dinner only soup + entree

/1

$\underset{\text{soup}}{2} \times \underset{\text{entree}}{3} = 6$ choices

50 10 guitars, 4 cases, 6 amps, 3 fx

/1

different setups: $10 \times 4 \times 6 \times 3 = 720$

56. Aaron, Bobbette, Chuck, Deirdre, Ed + Fran

A B C D E F

6 seats at theater starting at aisle

a) choices for aisle seat - 6
b) second seat - 3 (3 of opposite sex)
c) third seat 2
d) fourth 2
e) fifth 1
f) sixth

/2

$6 \quad 3 \quad 2 \quad 2 \quad 1 \quad 1 = 72$

Section 11.3 20, 24, 34, 42, 50

20 1st, 2nd + third to be awarded to 10 possible people

outcomes $P(10,3) = \frac{10!}{(10-3)!} = 10 \times 9 \times 8 = 720$ /2

order matters

24. Sample of 5 CD players selected from 24

order doesn't matter $C(24,5) = \frac{24!}{19!\,5!} = \frac{24 \times 23 \times 22 \times 21 \times 20}{5!}$

$= 42504$ /2

34. Flush hands in poker

only cards of a single suit $C(4,1)C(13,5) = 4 \times \frac{13!}{8!5!} =$

(includes royal + straight flushes) 5148 /2

42 Counting card hands 5 card hands from 52

a) 4 clubs + one non-club 39 non clubs in deck

$C(13,4)C(39,1) = \frac{13!}{9!4!} \times 39 = 27885$

b) 2 face cards + 3 non face cards

face $= 4 \times 3 = 12$

non face $52 - 12 = 40$

so $C(12,2)C(40,3) = \frac{12!}{10!2!} \times \frac{40!}{37!3!} = 652080$

c) 2 red cards 2 clubs & a spade

red cards = 26

clubs - 13

spades - 13

/3

so $C(26,2)\,C(13,2)\,C(13,1)$

$= \frac{26!}{24!2!} \times \frac{13!}{11!2!} \times 13 = 32550$

56. 9 people distributed among 3 committees of 2, 3 & 4 members & chairperson selected from each

How many ways

/2

$C(9,2) \times C(7,3) \times C(4,4) \times C(2,1) \times C(3,1) \times C(4,1)$

- $C(9,2)$: choose members of 2 person com
- $C(7,3)$: 3 person committee
- $C(4,4)$: 4 person
- $C(2,1)$: choose chair of 2 person
- $C(3,1)$: chair of 3 p
- $C(4,1)$: chair of 4 p

$= \frac{9!}{7!2!} \times \frac{7!}{4!3!} \times 1 \times 2 \times 3 \times 4 = 30240$

Section 11.4 42, 46

42 $(x+y)^8 = C(8,0)x^8 + C(8,1)x^7y + C(8,2)x^6y^2 + C(8,3)x^5y^3 + C(8,4)x^4y^4 + C(8,5)x^3y^5 + C(8,6)x^2y^6 + C(8,7)xy^7 + C(8,8)y^8$

$= x^8 + 8x^7y + 28x^6y^2 + 56x^5y^3 + 70x^4y^4 + 56x^3y^5 + 28x^2y^6 + 8xy^7 + y^8$

/2

46 $(3d+5f)^4$

$= (3d)^4 + 4(3d)^3(5f) + 6(3d)^2(5f)^2 + 4(3d)(5f)^3 + (5f)^4$

$= 81d^4 + 4(27)d^3 5f + 6(9)d^2 25f^2 + 4(3)d(125)f^3 + 625f^4$

$= 81d^4 + 540d^3f + 1350d^2f^2 + 1500df^3 + 625f^4$ /2

11.5 18, 26, 30

18. Chalon has 9 major assts to complete, 2 involve essays
How many different choices include at least one essay?
Order is not important.

Total choices $C(9,2) = \frac{9!}{7!2!} = 9\times 8 = 72$ /2

Choices with NO essay $C(7,2) = 7\times 6 = 42$

→ Choices with at least 1 $= 72-42 = 30$

26 Single card drawn from 52
face card or black card
F B

face cards total $= 3\times 4 = 12$
black cards $= 26$
black face cards $= 6$

$N(F) = C(12,1)$
$N(B) = C(26,1)$
$N(F\cap B) = C(6,1)$ /2

so $N(F\cup B) = 12+26-6 = 32$ ways

30 52 card deck, 5 card poker hands

Cards of more than one suit (complement of all the same suit)

ways to get all same suit = $C(4,1)C(13,5) = 5148$

↑ choose suit ↑ choose 5 cards

so # ways to get cards of more than one suit / 2

$= 2,598,960 - 5148 = 2593812$

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