

## Discrete Mathematics – Day 29 – Wednesday, November 3 Talaya Petteway

Review of the homework which was due

#3. How many anagrams?

$$\frac{3! \cdot 4! \cdot 8!}{3!}$$

#5. You have 2 choices at each step, for the first 3 steps.

2 x 2 x 2 number of ways to walk to any place with 3 steps

#7. A walk has to have 6 Right steps, 3 Up steps and 2 Back steps. Thus, the number of walks is the number of anagrams of "RRRRRRUUUBB"

$$\frac{11!}{6! 3! 2!} = 4620$$

#8. Task with 2 parts

Trident into pockets    20 packets, 4 pockets

$$P \boxed{PPPQQ \dots Q}$$

$$= \frac{23!}{3!20!}$$

Dentyne into pockets    12 packets into 4 pockets

$$\boxed{PPPPQQ \dots Q}$$

$$= \frac{15!}{3!12!}$$

The answer is the product of  $\frac{23!}{3!20!}$  X  $\frac{15!}{3!12!}$

Can we do both gums at once, to get the answer:  
 PPPDDDD.....DTT.....T  $\frac{35!}{3!12!20!}$

No. This counts some assignments of gum to pockets as different when they are really the same...

Can different anagrams give the same gum distribution ?  
 i.e., did we count things more than once?

Kids	A	B	C	D
Dentyne	3	3	3	3
Trident	5	5	5	5

1 anagram that gives that distribution: PDDDTTTTTTPDDDTTTTTTPDDDTTTTT  
 But clearly there are many other anagrams which would give the same distribution of gum to pockets.

#6. Do anagrams of employees or anagrams of job?

Do anagram of job.

Employees A,B,C.....J

Emp:	A	B	C	D	E	F	G	H	I	J
Job:	C	Cl	Cl	S	S	S	Sa	Sa	Sa	Sa

Anagrams of the 10 letter job "word"

Give assignment of duties

$$\frac{10!}{2!3!4!}$$

#12.

a. A to X : 4 ways

$$A \text{ to X to B} = 4 \times \frac{9!}{5!4!} = 504$$

b. X to Y =  $\frac{4!}{2!2!} = 6$  ways

$$A \text{ to X to Y to B} = \frac{4 \times 6 \times 5!}{3!2!} = 240$$

c. A to B:  $\frac{13!}{8!5!} = 1287$

1287- 504 (from part a.) =783

pass  
 through x

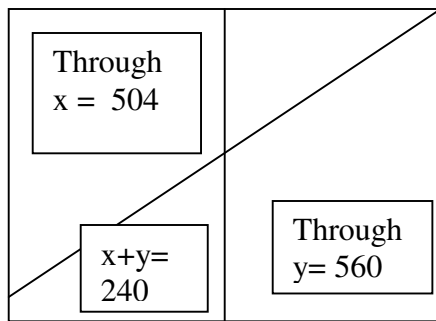
d. A to B without X or Y

Let the universal set U be the set of all paths from A to B

A to Y

$$\frac{8!}{3!5!}$$

So A to Y to B =  $56 \times 10 = 560$



$$1287 - 504 - 560 + 240 = 463$$

e. 2 part task

A to X = 4 ways

X to B without hitting y

(X to B) - (X to Y to B)

$$126 - (6 \times 10) = 66$$

$$66 \times 4 = 264$$

or

(A to x to B) - (A to X to Y to B)

$$504 - 240 = 264$$

**\* Extension Problems Due Monday: 13,14,15 3 points extra credit each (optional)**

4 dice, sum of 9

List all ways

\*List parts in decreasing order.

\*Helps keep list systematic

9 = 6+1+1+1            6 ways

5+2+1+1

4+3+1+1

4+2+2+1

3+3+2+1

3+2+2+2

Really no good way to get answer and will not be shown another way besides systematic .







