Problem	Repe-tition?	Order matters?	Fill in the Blanks	Factorial/ $_nP_r$ / $_nC_r$	Quirks?
How many ways to line up 6 people?	No	Yes	$6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$ = 720	$_6P_6 = \frac{6!}{0!} = 6!$ = 720	—
How many ways can you seat 4 people around a round table?	No	Yes	$\frac{4 \cdot 3 \cdot 2 \cdot 1}{4 \text{ rotations of each}}$	$(4-1)! = 3!$	Circle no clasp can't flip
How many ways can 5 people be lined up if Biff&Sally just HAVE to be next to each other?	No	Yes	$(4 \cdot 3 \cdot 2 \cdot 1) \cdot 2$ B&S "linked", flip B,S	$_4P_4 \cdot 2$ $= 4! \cdot 2 = 48$	treat linked people as 1 person
How many different 5-card poker hands are possible?	No	No	$\frac{52 \cdot 51 \cdot 50 \cdot 49 \cdot 48}{5!}$	$_{52}C_5 = \frac{52!}{47!5!}$	Combinations easiest!
How many ways can you have a flush in poker? (5 cards of the same suit).	No	No	$\frac{52 \cdot 12 \cdot 11 \cdot 10 \cdot 9}{5!}$	$_4C_1 \cdot _{13}C_5$ (suit) (ranks)	
How many ways can the judges choose 1st to 5th places from 10 tap dance contestants?	No	Yes	$10 \cdot 9 \cdot 8 \cdot 7 \cdot 6$	$_{10}P_5 = \frac{10!}{5!}$	—
How many boy/girl sequences are possible w/6 kids? (BBGGBB is 1 sequence, GBBBBG is another).	Yes	Yes	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ $= 2^6 = 64$	—	—
How many ways can the 4 call letters of a radio station be arranged if you must start with a K or W and no letters repeat?	No	Yes	$2 \cdot 25 \cdot 24 \cdot 23$	$2 \cdot _{25}P_3$	Start K or W
Lunch at Chez Samhita consists of entrée, 2 vegetables, and a dessert. If there are 4 entrées,6 vegetables, and 7 desserts available, then how many lunches are possible?	No	N/A	$4 \cdot _6C_2 \cdot 7$ $4 \cdot [_6C_2 + 6] \cdot 7$ ←repeat veggies OK	no repeat on veggies	—
The Secret Math Society is electing new members by approval voting. Current members get a ballot w/the names of 5 candidates and check off the ones whom they would approve. In how many ways can members fill out the ballots?	No	No	$2\,2\,2\,2\,2$ $= 2^5$	$_5C_5 + _5C_4$ $+ _5C_3 + _5C_2$ $+ _5C_1 + _5C_0$	N-set $\Rightarrow 2^n$ Subsets

NOTE ANY → NUMBER OF BOYS/GIRLS

II. Make up a counting problem that has the following number as its answer:

a) $_{52}C_3$

b) $_{12}C_3$

c) $_{25}P_{11}$

d) 2^5

e) $3(2^{10})$

possible answers for part II:

a) How many ways can you deal a 3-card hand from a standard poker deck?
b) How many ways can a committee of 3 people be picked from the 12 school board members?
c) I am going to choose 11 of my DVDs to arrange on the shelf. How many ways can I do this?
d) How many different patterns of heads and tails are possible if a coin is tossed 5 times?
e) Big Louie's Pizza Parlor offers 3 types of crust and 10 toppings. How many different pizzas are possible?