Where do you want to start?

Mild

- 1. Francine has 26 letter tiles, one for each letter of the alphabet. How many ways could she arrange all of the letters in a circle? (26-1)! = 25!
- 2. Brandon has scrabble tiles that spell M,A,T,H,E,M,A,T,I,C,S. He arranges them in order to make "words", how many words can he make if he uses... 11 tiles, 8 unique letters . 2M's . 2 A's . 2 T's
 - a. All the tiles?
 - b. An arrangement of four tiles using only unique letters?
 - c. Four of the tiles using unique letters, but the first letter must be an M?

a)
$$\frac{11!}{2!2!2!}$$

- b) $\frac{8.7 \cdot 6.5}{1.7 \cdot 6.5} = 8^{9}$
- 3. Simplify the following:

 - a. $\frac{(n+2)!}{n!} \qquad \underbrace{(n+2)(n+1)(n+1)}_{n+1}$

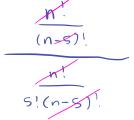
(n+2)(n+1)

 $n^2 + 3n + 7$

- b. $\frac{(n+4)!}{(n-1)!} = \frac{(n+4)(n+3)(n+2)(n+1)(n)(n-1)!}{(n-1)!}$
 - (n+4)(n+3)(n+2)(n+1)(n)



- 4. Simplify the following:

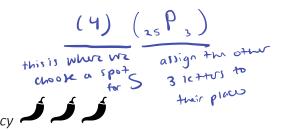


b. $\frac{nc_1}{nc_{n-1}} = \frac{n!}{(n-1)!(1!)}$

$$= \frac{n!}{(n-1)!}$$

this makes know b)c there are the same?

- 5. Let's go back to Brandon in Question 1 and his nerdy scrabble tiles. How many four-letter words can he make if he...
 - Ke IT ne... a. Only has vowels? $5 p_y = 120$ (sometimes $6 p_y$ for y)
 - b. Has an S in any location?



6. How many outfits can you make from 4 shorts, 3 shirts, 2 hats and 3 nose rings. Assume you must wear a shirt and shorts, but everything is optional.

$$(4.3.2.3) + (4.3.2) + (4.3.3) + (4.3)$$
all incl. hat incl. nose just 5+5

or... $(4.3)(6+2+3+1)$ or $(4.3)(4.3)$
4 nose options 3 hat options

7. Why is $_{100}C_{10} = _{100}C_{90}$? Explain in English, without just plugging the numbers into the formulas.

Review

- 8. In a state lottery, players choose 6 numbers between 1-49. The winning numbers are reported in increasing order.
 - a. How many total choices are there? w 05/24
 - b. If wants two of his numbers to be birthday (), then how many choices does have?