

## Last Permutation example

How many ways for people to  
NOT stand together.

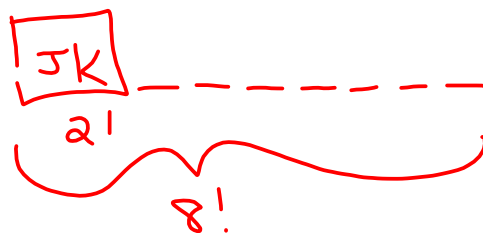
\* Total ways — # ways stand together

Example: There are 9 people to stand in a line. How many ways are possible if Karen and Joel do NOT stand together?

Total ways for 9 people to stand

$$9! = 362880$$

# ways for Joel & Karen to stand next to each other



$$2! \times 8! = 80640 \text{ ways}$$

\* Not stand together

$$362880 - 80640 = 282240 \text{ ways}$$