

# Combinatorics!



Fairview Elementary Math Club

<https://kaplandm.github.io/FVE/>

# Bracelets

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You are making bracelets. Each has five beads: three red, two blue. You wonder how many different sequences you can make. For example:

BBRRR

RRBBR

How many can you find? (How do you know there aren't more?)

# Dancing

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You have five animals



Chicken Owl Squirrel Bee Marmot

You want them to dance with each other, two at a time.

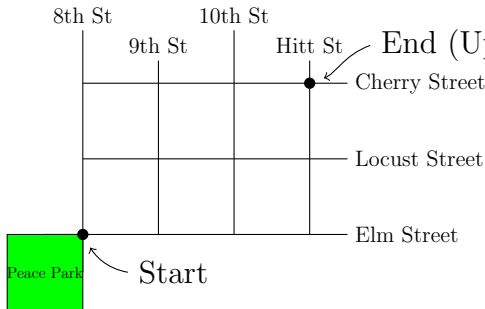


How many different pairs are possible?

# Walking to lunch

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You've enjoyed playing in Peace Park all morning, and now you're hungry for a slice of quiche from Uprise Bakery.



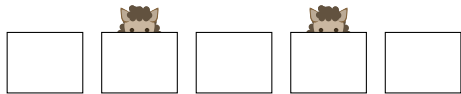
How many  
routes are  
there??

There are so many possible routes! For example: walk up (U) two blocks to Cherry, then right (R) three blocks to Hitt: UURRR. Or walk along Elm to 10th, then up to Cherry, then to Hitt: RRUUR.

# Sheep-in-a-box

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Your two sheep are playing a hiding game. There are five boxes in which they can hide.

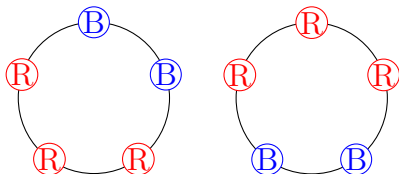


In how many different ways can the two sheep hide among the five boxes?

# Bracelets again

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Earlier, we thought about how many “bracelets” could be made using three red and two blue beads, but we treated them as straight lines, when really bracelets loop around. For example, as a straight line, **BBRRR** and **RRBBR** differ, but when you put them around your wrist, they become the same! (The three red are next to each other; there is no “end” or “beginning” anymore.)



How many different bracelets are there after you put them on your wrist?

# Dancing again

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Remember your five animals?



Chicken Owl Squirrel Bee Marmot

This time, each pair has a “lead” dancer. So Bee dancing with Squirrel as lead is now different than Squirrel dancing with Bee as lead.

How many different pairs are possible now?