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The Math of Spot it!

Before we all went on winter break, Jane shared a game with us. The game, Spot it!, seems like a simple card game. The rules are quick to learn: pull two cards, look at the images on them, and identify the symbol that is located on both cards. Sounds easy enough, but here is the tricky part: no matter which two cards you pick there will always be one, and only one, matching pair. How is it possible that out of 55 cards, each pair will have only one symbol in common? What is the math underneath this game, and can we learn enough about it to create our own versions of this game?

1) Learn the rules of Spot it! and play a few games with friends.

2) How does the game present the shapes? Is there anything about the shapes that make it more difficult to identify the pair?

3) Using index cards, create a version of this game using three symbols.

4) How many cards did you need to create? Can you make any predictions about how adding more symbols would impact the number of cards needed? Try 4, 5, or 6 symbols.

5) Try coming at it from a different angle. Instead of starting with the number of symbols total, try starting with 3 symbols on each card. If there are 3 symbols on each card, how many different symbols will we need to use in total? Can you make an example set?

6) How many symbols are used in Spot it! Are they used equally? If so, why? If not, why not?

7) Can you make a chart or other visual aid to show the pattern of symbols on each card?

8) Can you make a version of the game using a larger number of symbols?

9) There have been several math blogs written about this game and the math behind it, known as combinatrics. Do some research and see if you can find a pattern or function that will help in designing larger versions of this game.

10) Have fun!