



APPLICATION ACTIVITY

Instructions For Parents

Our Application Activity includes several math puzzles for prospective campers. These are intended to be fun! Encourage your child to play with them as long as they are happily engaged and making progress. However, some problems are challenging, so applicants should not feel pressured to finish every part of every problem.

Feel free to help your child read and understand the instructions for each activity, but give them a chance to engage with the activities independently. We want to see and understand their mathematical thought process, so the work submitted must be their own.

Scan your child's work and save it as a single multi-page PDF file. You will be asked to upload this file when you fill out the application form.



APPLICATION ACTIVITY

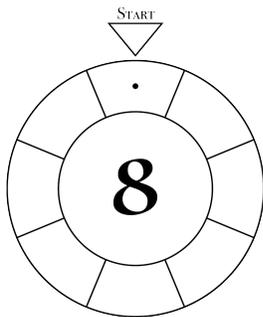
Star Tracks

The game of Star Tracks is played on a circular board. Starting with your pencil in the top space, repeat the following process:

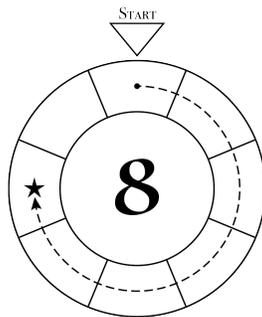
- **Step 1:** Move your pencil six spaces clockwise around the board.
- **Step 2:** Draw a star in the current space.

The game ends if your pencil is in the starting space at the end of Step 2.

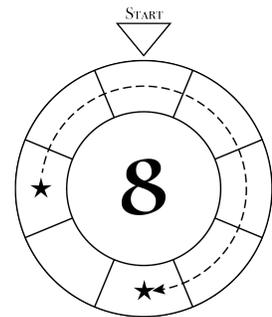
Here is a sample game, played on a board of size 8:



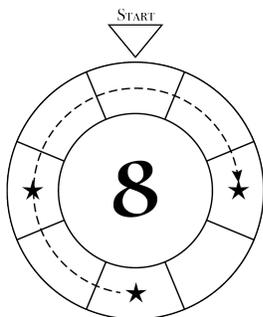
Start at the top space.



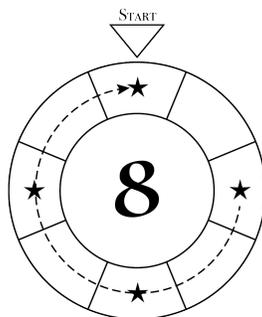
Count six spaces, then draw your first star.



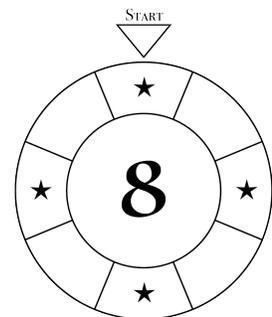
Count six more and draw another star.



Repeat the steps...



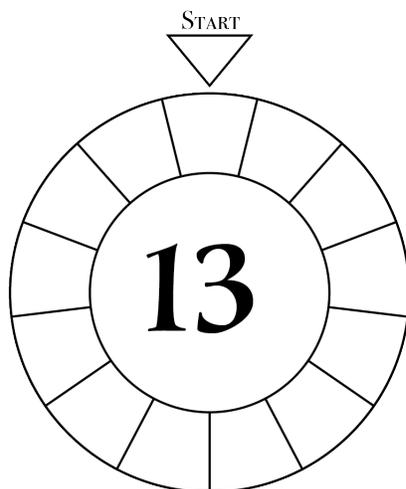
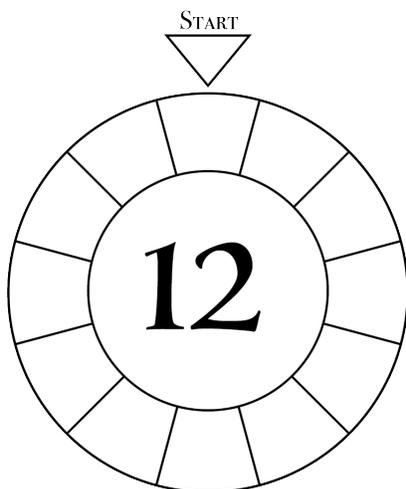
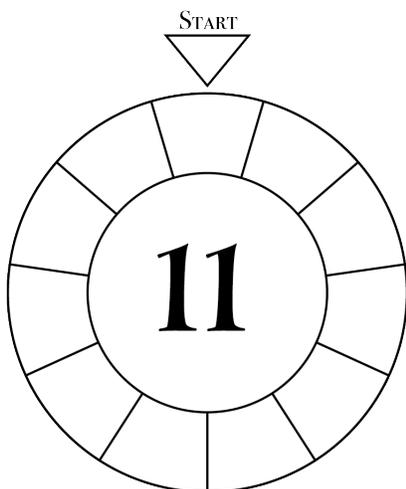
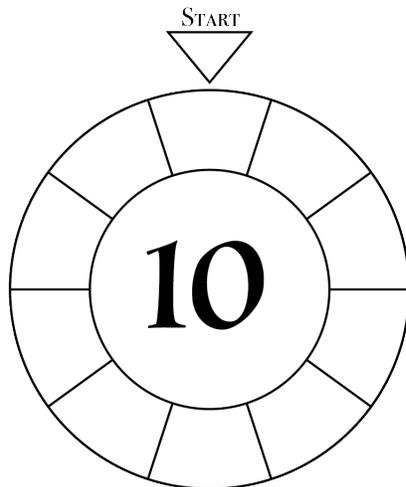
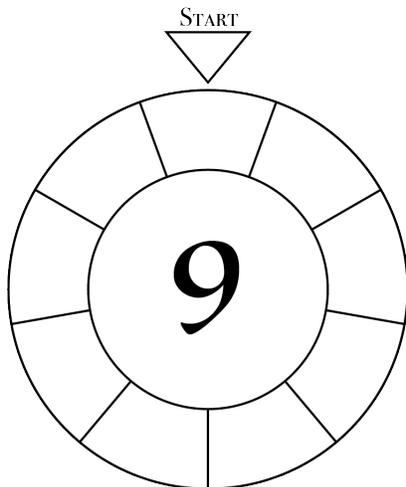
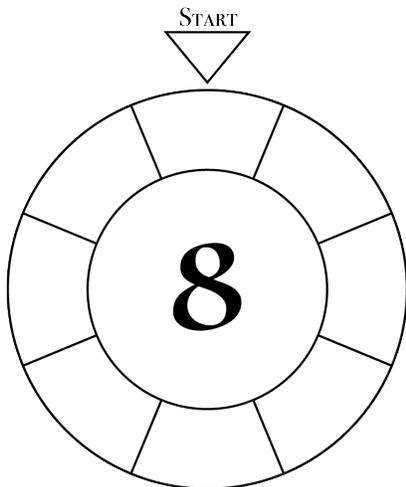
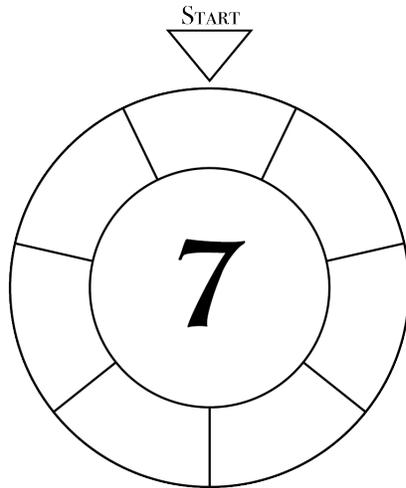
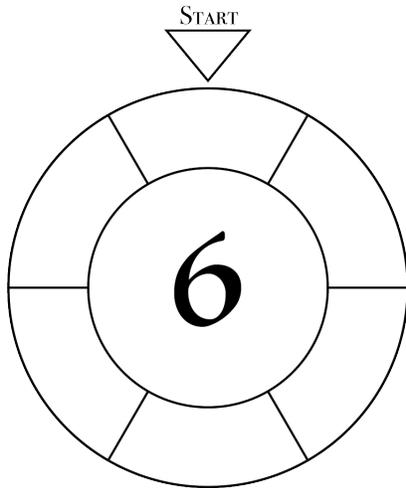
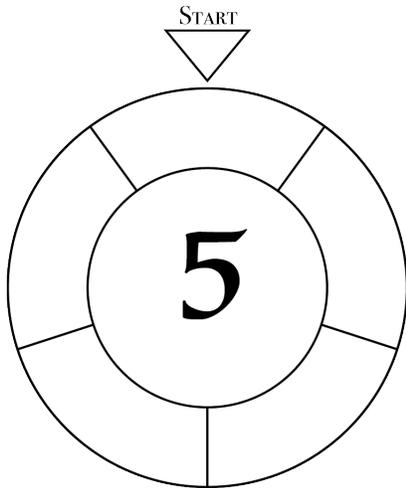
...until you land on the starting space.

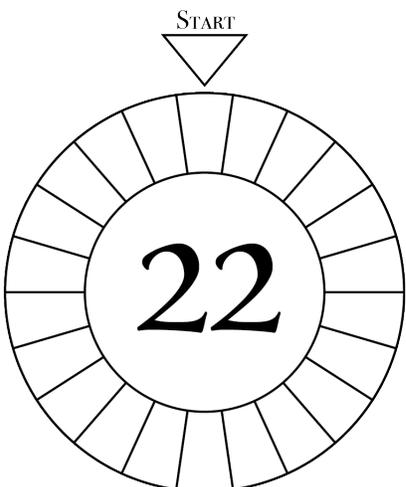
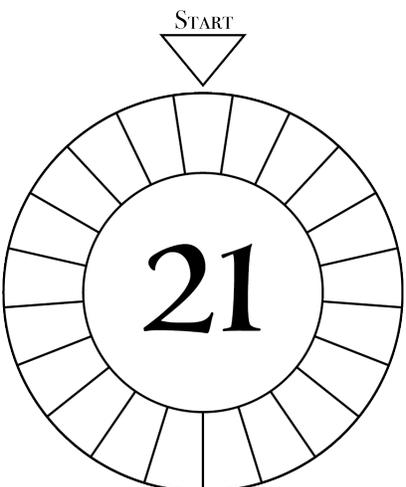
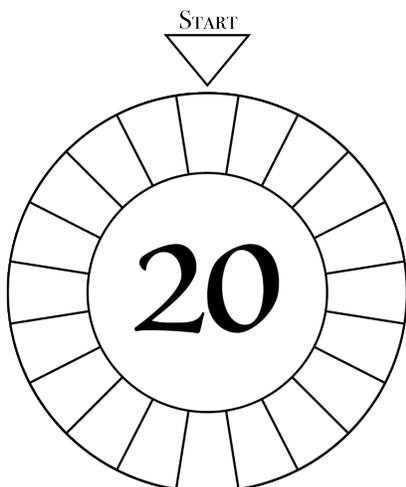
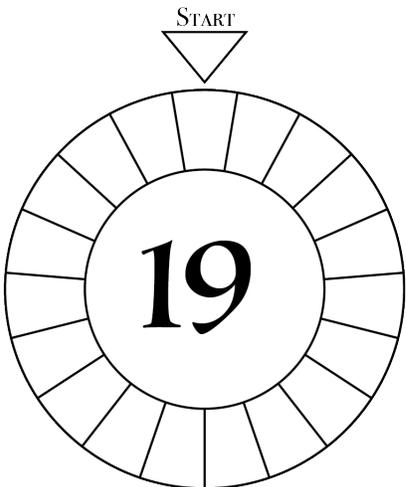
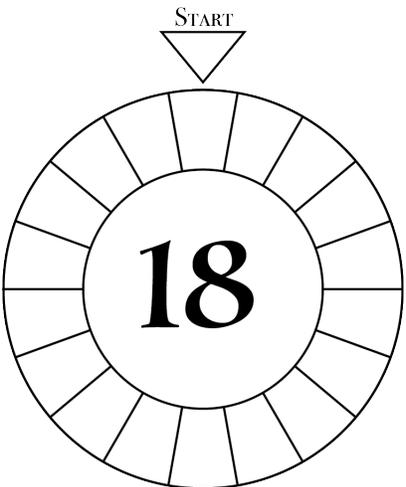
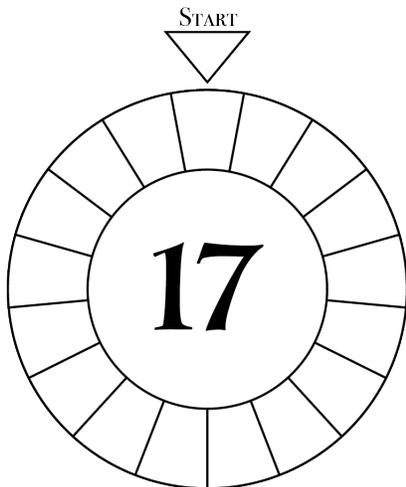
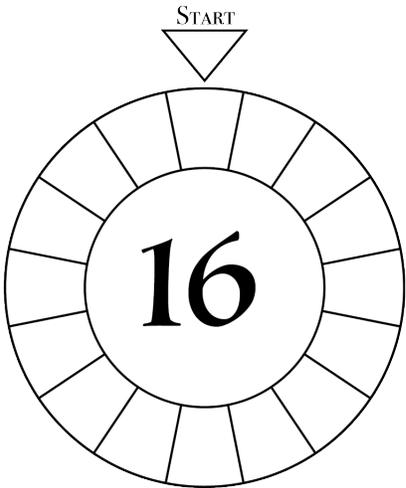
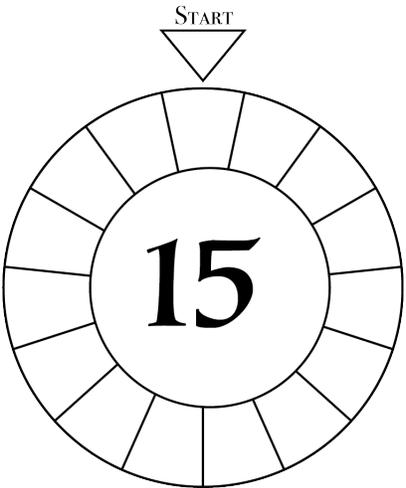
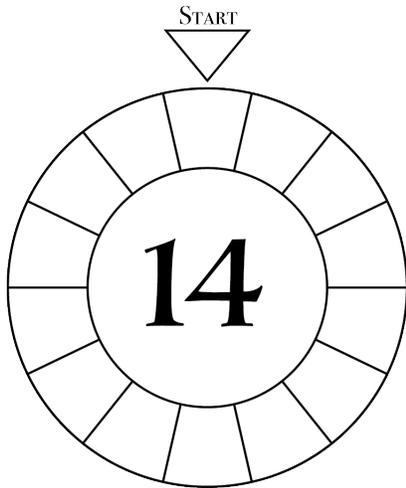


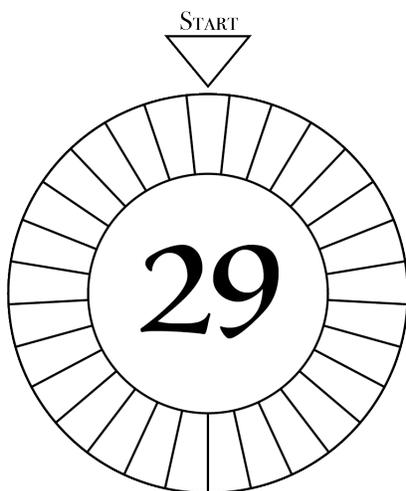
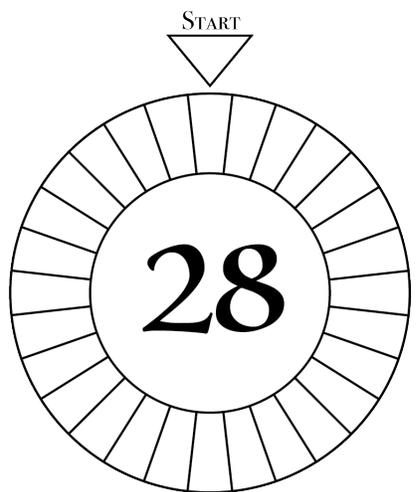
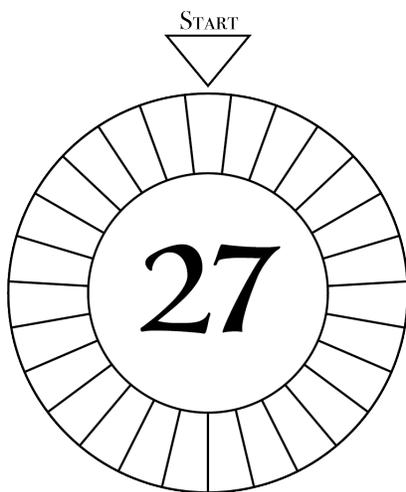
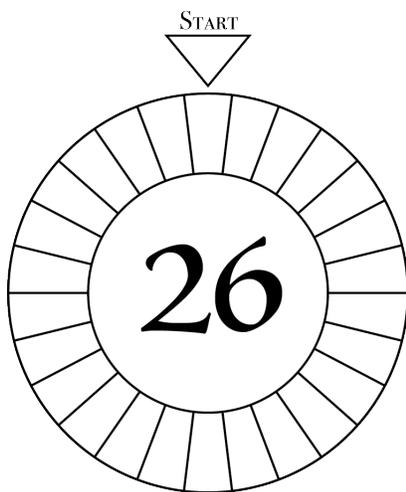
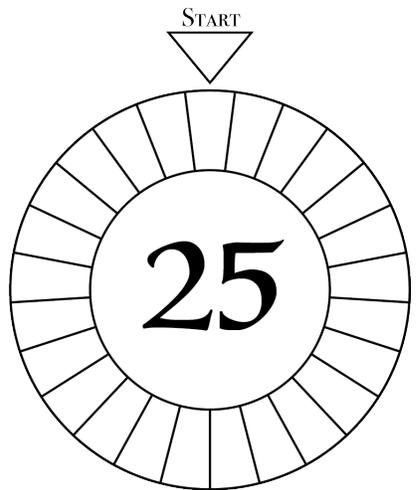
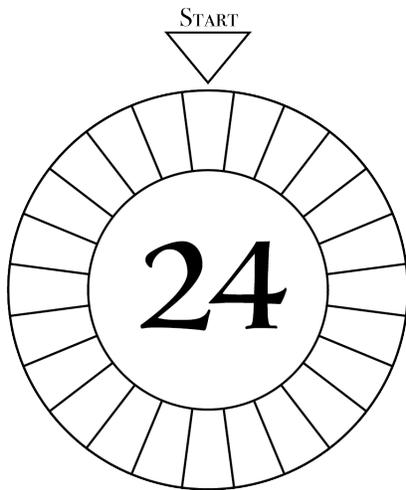
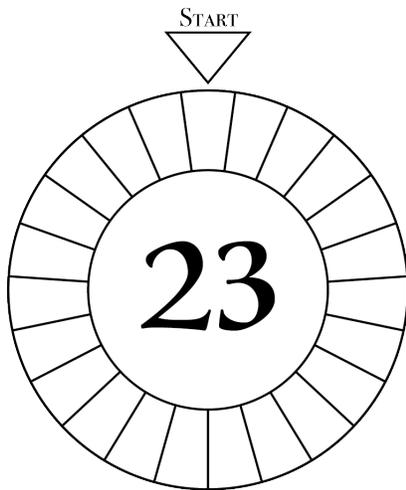
When you end Step 2 in the starting space, the game is complete.

Task 1:

The next three pages have game boards of various sizes. Play at least five games of Star Tracks, at least one on each page. (You can play more if you want to!) Be on the lookout for patterns in the resulting game boards.







Task 2:

Describe some of the patterns that you found as you were working on Task 1. Some questions to consider might be:

- When does the game end with a star in every space of the game board?
- Do you ever end up with two or more stars in the same space?
- Without playing a whole game, can you tell how many of the spaces will have stars, and how many spaces will be blank?

However, these aren't the only questions worth asking. Feel free to tell us about anything else you noticed, as well!

Task 3:

Do you think the patterns that you've noticed will always be true? If you can, explain why!

Star Tracks: The Next Variation

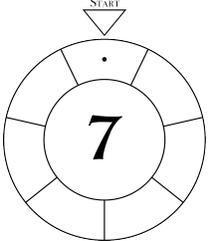
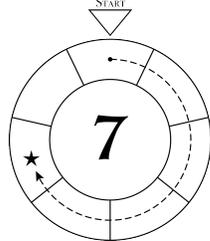
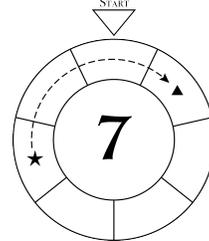
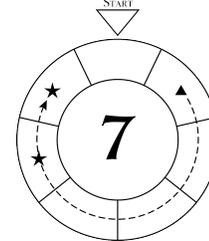
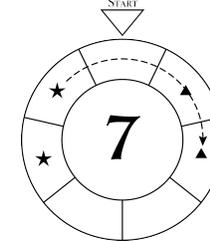
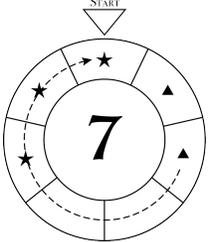
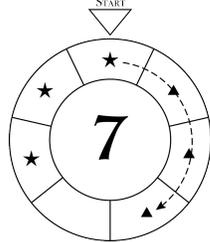
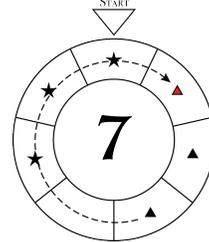
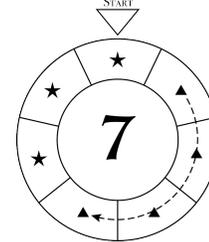
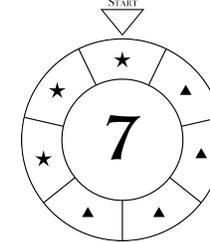
Now let's play a slightly more complicated version of Star Tracks. This game is also played on a circular board, starting in the top space. But in this game, we have more steps:

- **Step 1:** Move your pencil five spaces clockwise around the board.
- **Step 2:** Draw a star in the current space.
- **Step 3:** Move your pencil three spaces clockwise around the board.
- **Step 4:** Draw a triangle in the current space.

However, we are only going to draw a star or a triangle in Steps 2 and 4 if the space is empty. Otherwise, the space is Blocked—move on to the next step without drawing a shape.

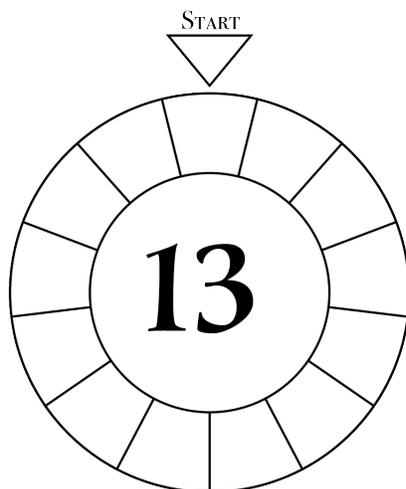
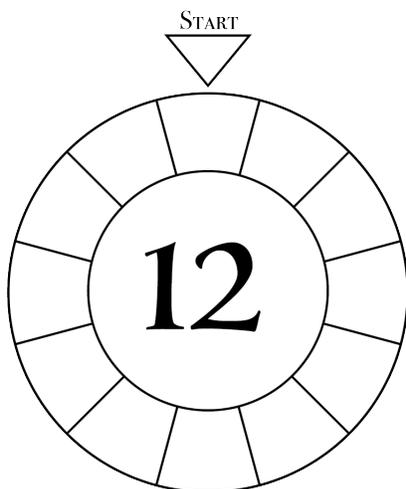
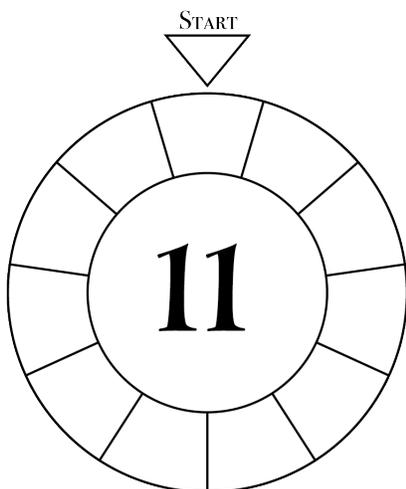
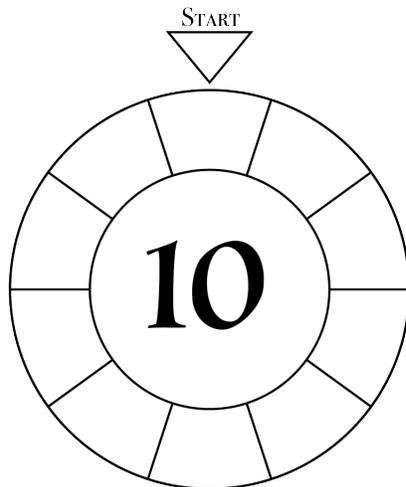
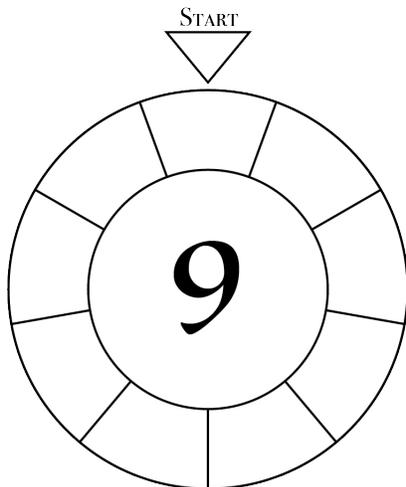
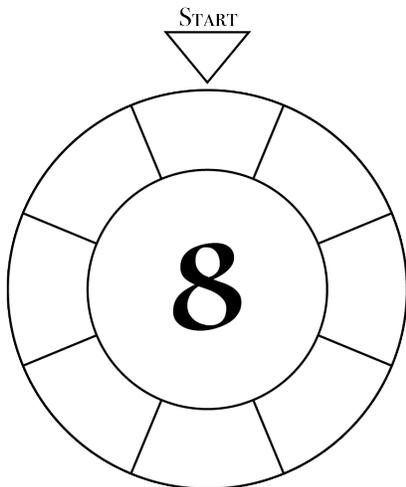
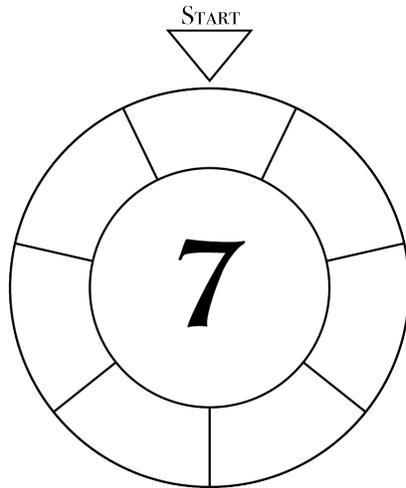
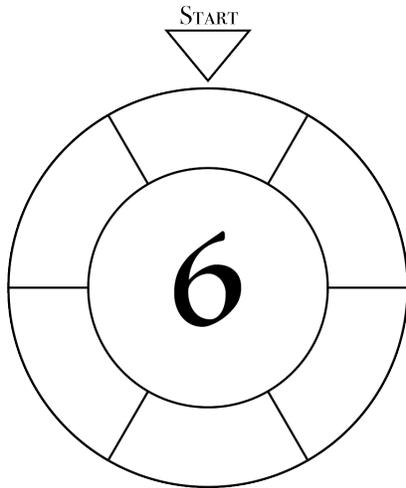
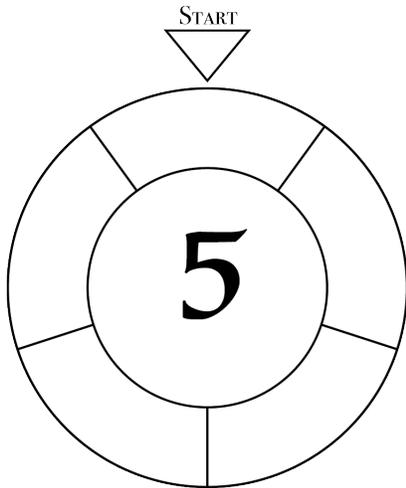
The game ends when all future shapes will be Blocked.

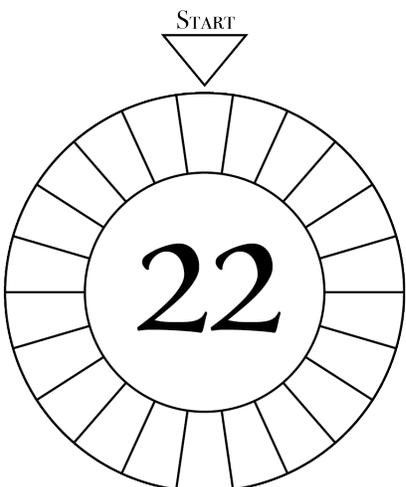
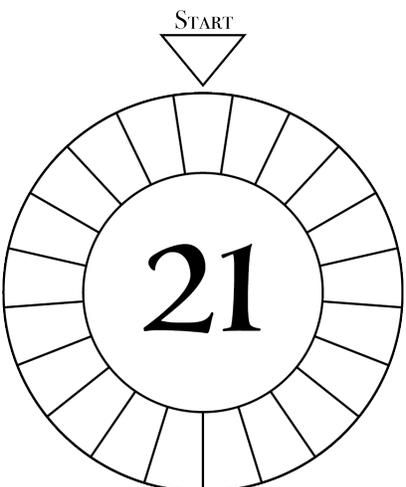
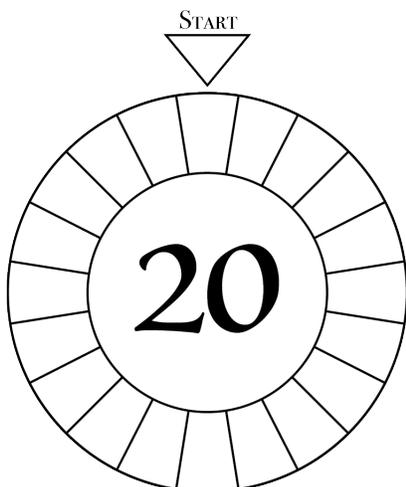
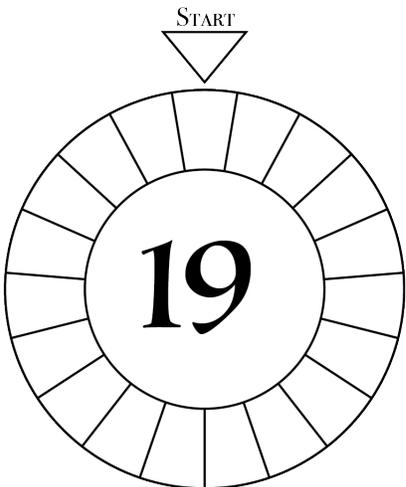
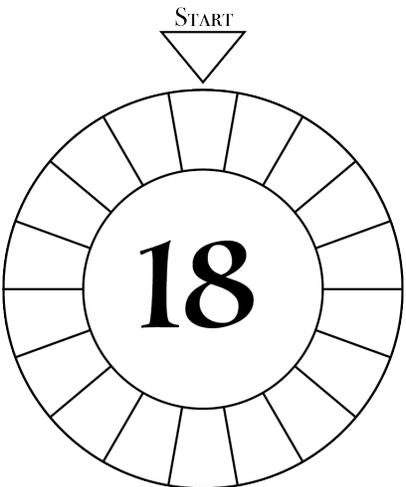
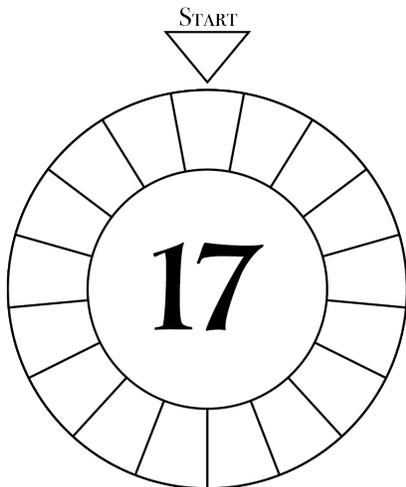
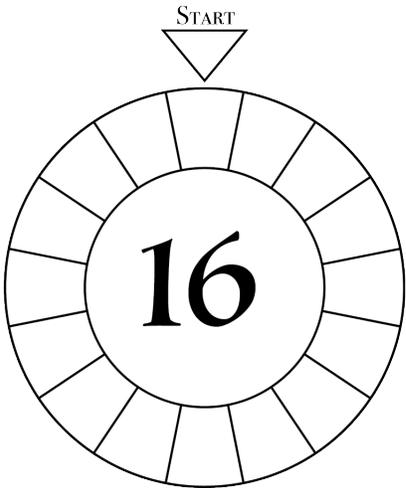
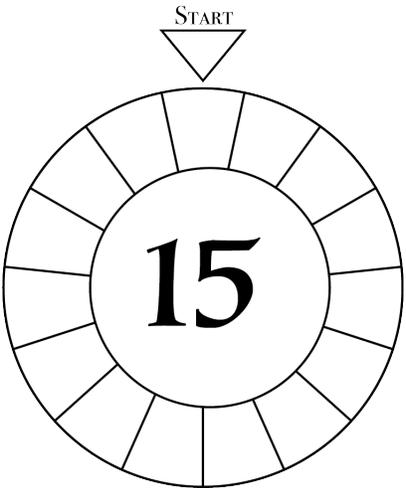
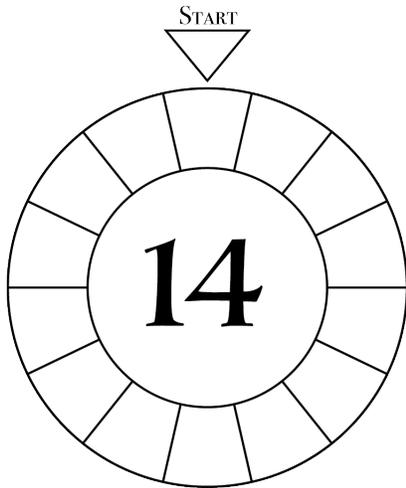
Here is a sample game:

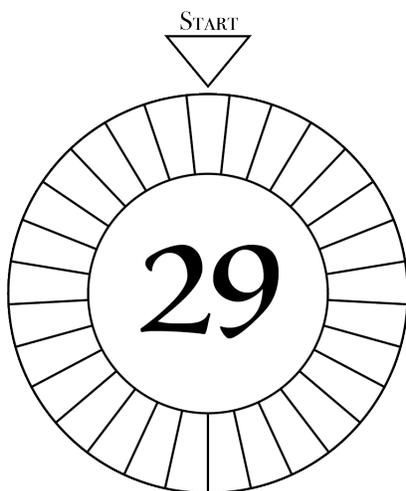
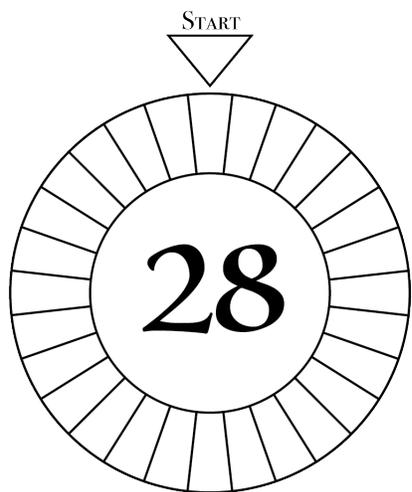
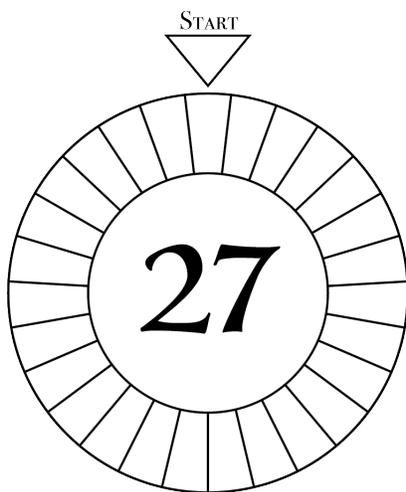
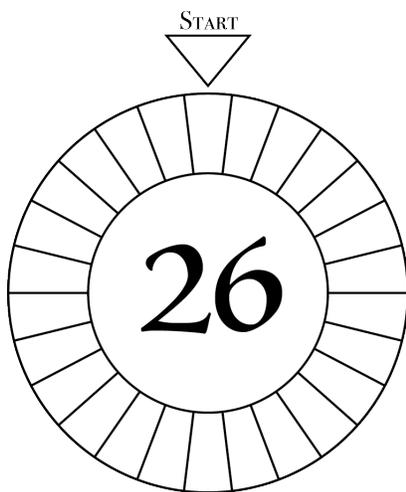
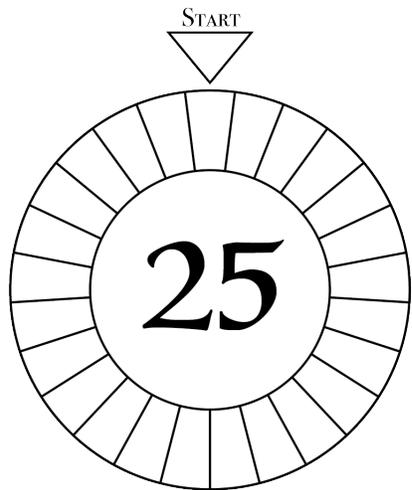
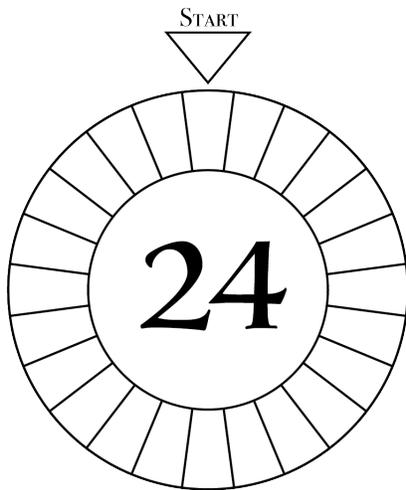
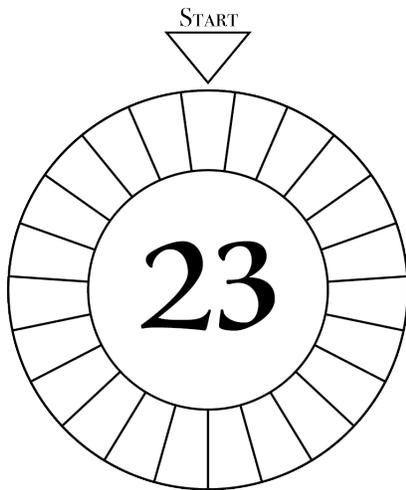
 <p>Start at the top space.</p>	 <p>Count five spaces and draw a star.</p>	 <p>Count three more and draw a triangle.</p>	 <p>Now we repeat. Count five and draw a star.</p>	 <p>Then count three more and draw a triangle.</p>
 <p>We continue...</p>	 <p>... to repeat these steps.</p>	 <p>But on this step, the space where we want to draw a star already has a triangle in it. Our shape has been Blocked.</p>	 <p>We skip to the step where we count three more spaces and draw a triangle.</p>	 <p>All the spaces are now full, so all future moves will be Blocked. This tells us that the game is finished.</p>

Task 1:

The next three pages have game boards of various sizes. Play at least five games, at least one per page. (You can play more if you want to!) Be on the lookout for patterns in the resulting game boards.







Task 2:

Describe some of the patterns that you found as you were working on Task 1. Some questions to consider might be:

- When does the game end with a perfect alternating sequence of stars and triangles on the board?
- When does the game fill the board, and when are there blank spaces?
- When does the game end with more stars than triangles? More triangles than stars?

However, these aren't the only questions worth asking. Feel free to tell us about anything else you noticed, as well!

Task 3:

Do you think the patterns that you've noticed will always be true? If you can, explain why!