

**Question 1:** A marketplace has one entrance, but 6 exits. A vendor wants to figure out which exit he should put his stand at so that the largest number of people possible will pass him. To figure it out, take turns flipping a coin with a partner to determine where the customers go. Start at the entrance at the top of the page. If you flip heads, go right. If you flip tails, go left. Continue until you get to an exit, and record the exit below. Do this at least 10 times with your partner, and record the data below.

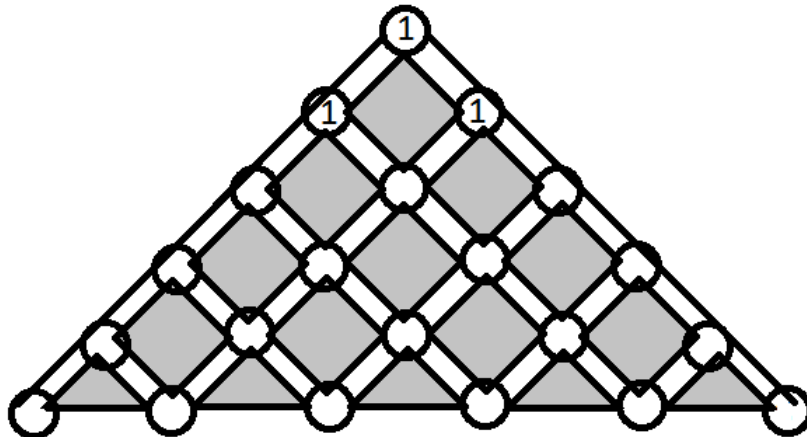
Trial number	Exit number
1	
2	
3	
4	
5	

Trial number	Exit number
6	
7	
8	
9	
10	

**Question 2:** Share your chart with the rest of your table. Which exits show up the most frequently? Which exits show up the least frequently? Why do you think this is? Discuss your answers with your group.

**Question 3:** How many ways are there to get to Exit 1? What about Exit 2?

**Question 4:** Fill in the chart below with the number of ways to get to each corner from the top. The first row is done for you. Is there a pattern to these numbers?



**Question 5:** With your group, figure out how many ways there are to get to each exit, and write this number below each exit.

**Question 6:** What did you notice about the more frequently used exits?

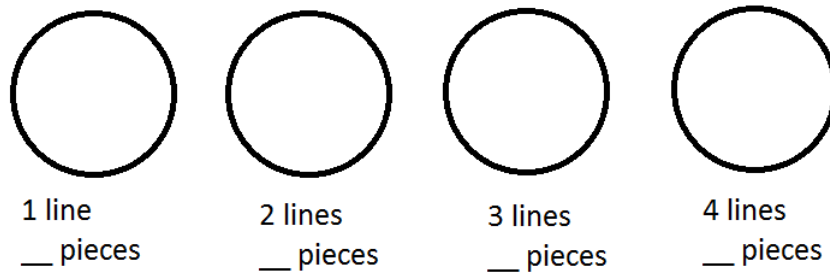
**Question 7:** This triangle is often called **Pascal's Triangle**. Write a question about Pascal's triangle, and exchange it with your partner. Can you answer your partner's question?

**Question 8:** Add each row in Pascal's triangle above and write the answers along the side of the triangle. What do you notice? Can you explain why this happens?

**Question 9:** What do you notice about the diagonals of Pascal's triangle? Discuss your answers with your group.

**Question 10:** With your group, arrange some pennies into a triangle. How many pennies did you use? Can you make a bigger or smaller triangle with pennies? Write down at least three numbers of pennies you can use to make triangles. Do you see these numbers anywhere on Pascal's Triangle?

**Question 11:** Draw a line through the first circle below. How many pieces did you divide the circle into? What is the LARGEST number of pieces you can divide a circle into with 2 lines? What about 3 lines? Can you figure it out for 4 lines? Use the circles below to solve the problem with your group. Is there a pattern to these numbers?



**Challenge:** A house has 10 stairs. How many different ways are there to run up the stairway taking either 1 step or 2 steps at a time? (For example, one way would be 1,1,1,1,1,1,1,1,1,1 and another would be 2,1,2,2,2,1)