# Grade 6 Math Circles
November 22/23/24, 2022
## Pascal's Triangle Problem Set

1. Create Pascal's triangle with rows 0 to 14. Refer to this triangle for the rest of the problems.

2. What is the sum of the entries in row 12 of Pascal's triangle?

3. Use Pascal's triangle to find 11^9.

4. Find the 14th Fibonacci number using Pascal's Triangle.

5. Use Pascal's triangle to find 13^2.

6. Try building a triangle using our addition rule but starting with a number other than 1. What do you notice about your triangle? Does it relate at all to Pascal's triangle?

7. For each of the grids below, count how many paths can be taken from the dot marked START to the dot marked END by moving along the lines and only moving down or to the right. Below is an example.
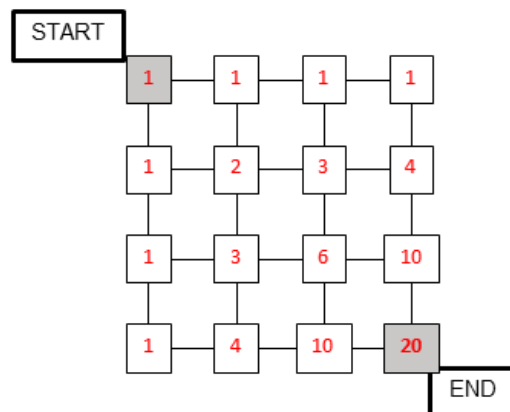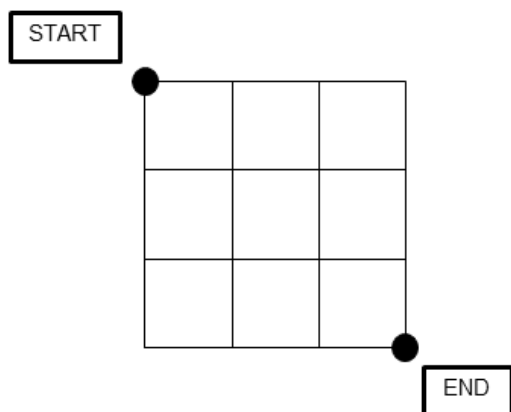
We can write the number of paths which can be taken to get to each point. So, the number of paths which can be taken to get to one specific point, a, is just the sum of the number of paths for each of the two points which can be taken to get to a. In the above example, there are 20 different paths from START to END.

a)

b)

c)

d)

e)

f)
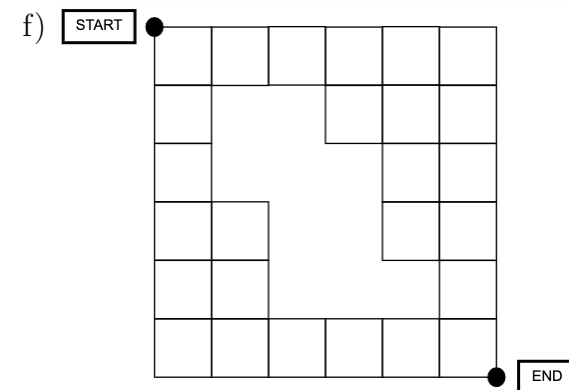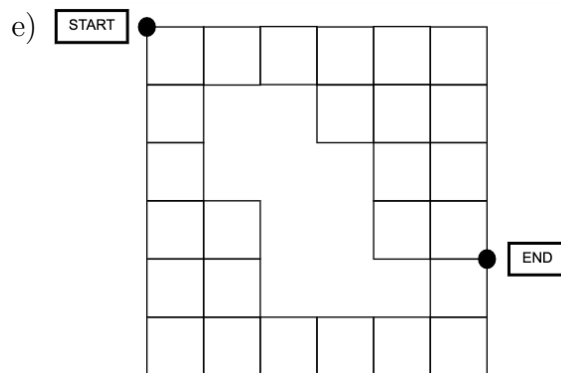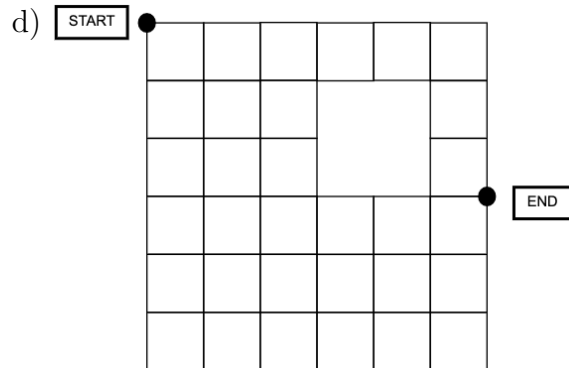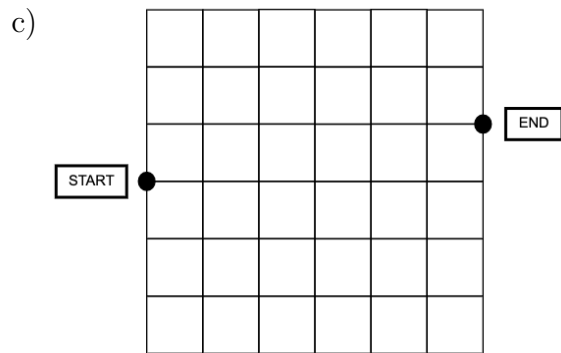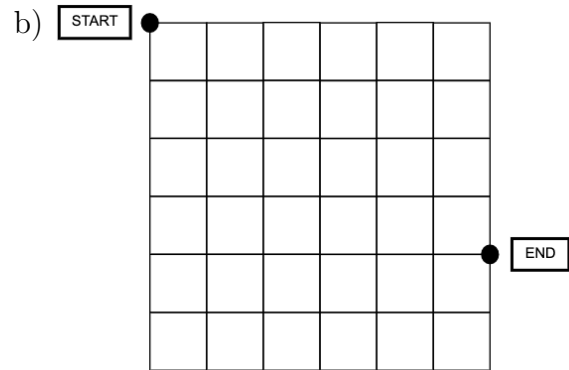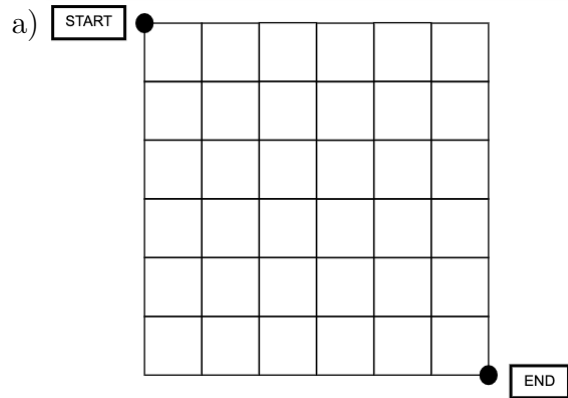
8. Using the following diagram, how many ways can you make a path that spells MATH CIRCLES by starting at M and moving downwards?
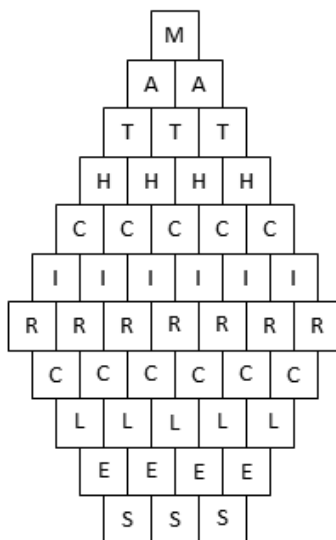
9. A student council is made up of 6 students in grade 5 and 8 students in grade 6. They want to choose 4 students to speak about various topics in the next assembly.

   a) How many ways can they choose the 4 students without restrictions?
   b) How many ways can they choose the 4 students if they can only choose grade 6 students?
   c) How many ways can they choose the 4 students if there must be an equal number of grade 5 and grade 6 students?