Math Department Problem of the Month

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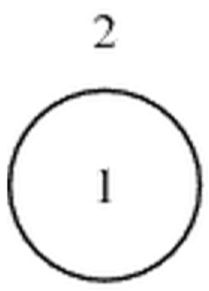
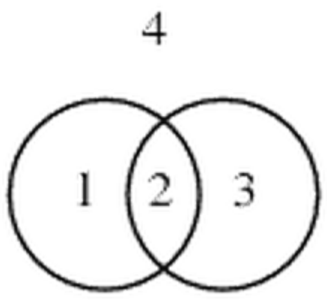
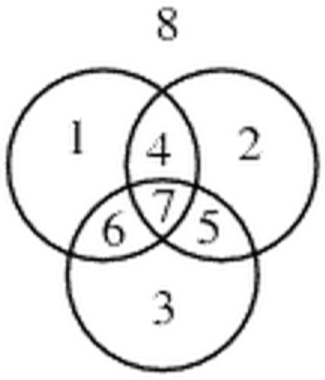
One circle will divide the plane into two regions, as seen below:



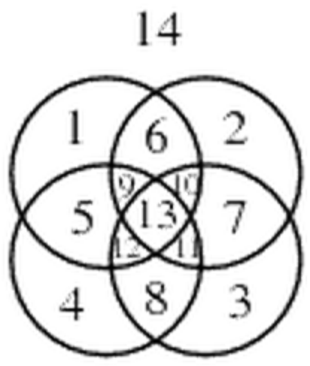
With two circles, drawing them overlapping will divide the plane into four regions:



When drawing three circles, things start to get more complicated. You should be able to convince yourself that no matter how you draw the picture, you will be able to divide the plane into a maximum of eight regions:



With four circles and even more experimentation, we can divide the plane into at most fourteen regions:



These results can be summarized in the following table:

Number of Circles	Max Number of Regions
1	2
2	4
3	8
4	14
5	**??**
6	**??**
⋮	⋮

- **Fill in the table above for up to 8 circles. Explain how you figured out each entry.**
- **Can you find a pattern? Describe how to determine the maximum number of regions for any number of cirlces. If possible, write an equation to determine the maximum number of regions for n circles.**