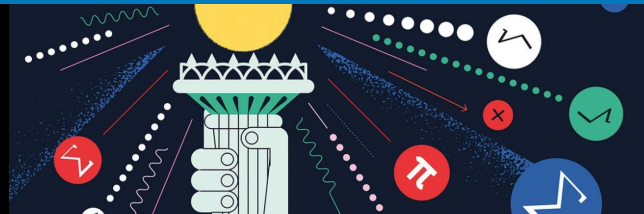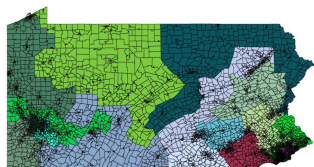# How Math Can Save Democracy
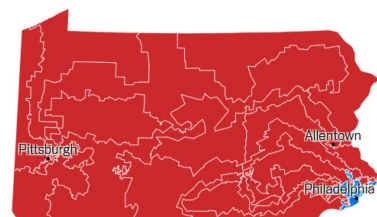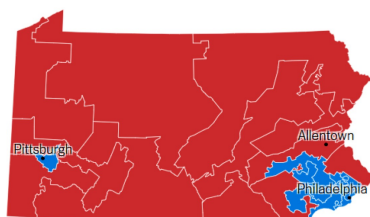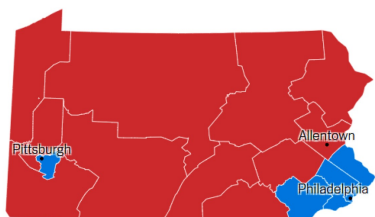
## Can Math Solve the Gerrymandering Problem?

**1. What kind of 2018 maps are you looking at?**
   a. Which state do they represent?
   b. What is each map's relation to the gerrymandering problem? Justify.

**2. As a mathematician, what could you do to prove a case of partisan gerrymandering?**
   a. Which data, criteria or parameters would you study to evaluate the degree of partisan gerrymandering of a particular map and its impact on elections?
   b. Would you imagine particular equations to prove or to account for the phenomenon of partisan gerrymandering?

**3. Watch _Vox_'s video about "The algorithm that could help end partisan gerrymandering" (00:00-02:10) and answer the following questions.**
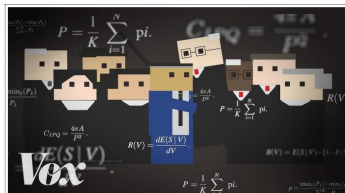
   a. Why is it so difficult for the Supreme Court to rule against gerrymandering? In other words, why do they need mathematicians?

   b. What is the mathematicians' strategy to prove a partisan gerrymandering?

   c. What criteria are they taking into account?

**4. Now that you gathered more information, consider question 2 again.**
   a. What specific data and figures would you analyze to account for the various criteria? What relations would you pay attention to through equations?
   b. To go further in your hypotheses and attempt to design a precise equation, you may have a look at the "GM-Clue" document on Célène.

**5. Do you think about other instances of data manipulation that math can help with (whether on the dark side or on the light side)?**

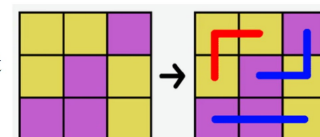**6. Are you a genius at gerrymandering?**

**Puzzle 1: Easy**

Divide the grid into 5 regions of 5 cells each. Purple, the minority colour, must win the majority of regions.
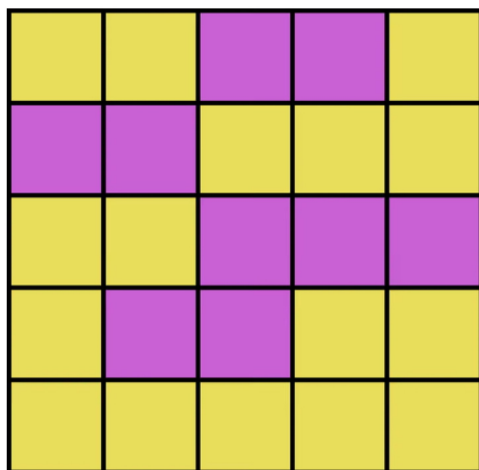
Try and solve Alex Bellos's gerrymandering puzzles.
If you are lost, your partner may look at the solution for the second puzzle on Célène and give you directions.

**Example**

Divide the grid into 3 regions of 3 cells each. Purple, the minority colour, must win the majority of the regions.

**Puzzle 2: Medium**

Divide the grid into 5 regions of 10 cells each. Purple, the minority colour, must win the majority of regions. No ties allowed in any region.