CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
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Project Number
J1208

Project Title
Pick's Theorem and the A.C. Extension

Abstract

Objectives/Goals
The purpose of my project is not to only prove Pick's Theorem because that would be a bit boring. I also wanted to see if his theorem works on alternately consistent spaced grids. If not, I wanted to see if I can come up with a formula of my own that would work. My hypothesis was that Pick's Theorem should work on my alternately consistent spaced grids. Also, since the grids are consistently spaced I should be able to derive a formula of my own from my data.

Methods/Materials
I used one-fourth inch by one-fourth inch grid paper, alternately consistent spaced grid paper(a.k.a Aaron's Grid Paper),colored pencils,and a calculator. Basically, I drew polygons on regular grid paper and alternately consistent grid paper. I found the areas of these shapes using traditional methods and with Pick's Theorem. If Pick's Theorem would not work, I tried to derive my own formulas that would work.

Results
I found out that Pick's Theorem did not work with my squares on my type of grid. Therefore, I had to come up with my own formula. The formula is not exact, but with some rules it comes out right every time. I call it Aaron's Formula. The formula is (A=2.25I + 0.7B - 1). The variable (I) stands for the number of interior points and (B) stands for the number of boundary points when graphed. The variable (A) is the area. Now, when you multiply 2.25I or 0.7B, the answers will not always be whole numbers. That's where Aaron's Rule comes in! Since you might get a whole number with a decimal it will be a bit hard to calculate the areas. My rule states that if it is an odd number to round up, and if it is an even number to round down. If it is already a whole number just leave it alone.

Conclusions/Discussion
My conclusion is that Pick's Theorem did not work on my alternately consistent spaced grids. The formula is not exact, but I am currently trying to find one that is. I am also experimenting with formulas for polygons other than squares.

Summary Statement
My project is about experimenting if Pick's Theorem will work on finding the area of polygons on alternately consistent spaced grids and if not, coming up with my own formulas that will work.

Help Received
School teachers helped explain mathematical terms.