



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Adhayana Paul	Project Number J1411
Project Title How Big Is Your Icosokaihenagon?	
Abstract	
Objectives/Goals The purpose of this project is to find out if there is a relation between the area of any regular polygon and it's height.	
Methods/Materials First, all the areas were calculated for the regular polygons with sides 5-21 and heights 1-15 for each of them. This was done using a website. Then I found the ratios for them which was area/height squared. Then, I graphed the deltas ($\pi/4 - \text{constant}$) using Excel and it looked like an exponential decay ($d=De^{-kn}$). I tried to derive k (constant) which would satisfy all the deltas, but one individual k could not be identified.	
Results I found out that the area/ height squared for each polygon had it's own constant. The constant got closer to $\pi/4$, or 0.78, as the number of sides increased. Then the k values were derived but every k value was different and the results were too inconsistent to make into a formula.	
Conclusions/Discussion It was not possible to find a formula for all the regular polygons, but it was possible to find a pattern for each individual polygon. There should be an equation since the line is such a perfect curve, but I couldn't find that equation.	
Summary Statement The project's goal was to find out the relation between the height of any regular polygon and it's area.	
Help Received My dad helped me using Excel, introduced me to exponential decay formulas, and taught me how to find the constant values in the formula.	