



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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| Name(s) Page A. Uriarte | Project Number J1322 |
| Project Title From Another Angle: The Epic Tale of Ten Regular Polygons | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The problem I will be experimenting on is how the number of sides on a regular polygon affects the area of the polygon, in comparison to other polygons with the same fixed perimeter. I believe that the area of a regular polygon increases as the number of sides the polygon has increases.</p> <p>Methods/Materials In order to test this, I will calculate the area of the regular polygons with a number of sides ranging from three to twelve, but keeping the perimeter the same for all the polygons. I chose 30 cm as my perimeter because a great majority of the numbers between three and twelve divide 30 evenly, or at least rationally. With other perimeters, the length of the sides would be an irrational number, which can cause the calculations to be accurate, but not as accurate as possible.</p> <p>Using trigonometric ratios, I found the area of the regular polygons, and then, in order to ensure that my calculations were not faulty, I had my Algebra 2 teacher, Mr. Remillard, look over my work, and he checked it, making sure there were no errors in calculation. I was then able to conclude that my work was accurate and I was then ready to analyze that data, and make a conclusion.</p> <p>Results I found that if the number of sides on a regular polygon increases, then the area of the polygon increases as well. In addition, I was also correct in predicting that the polygon with the apothem had the largest area, because when using the formula for the area of a regular polygon, the only variable that could have affected the area on this situation was the apothem, so the longer the apothem, the larger the area.</p> <p>Conclusions/Discussion After analyzing my data, I made one significant observation not stated above. I noticed that as the number of sides increased, the more the polygon looked like a circle. I decided to do some additional experimentation, so I found the area of a circle that had a circumference of 30 cm. I found that the more sides on the polygon, the closer the area will be to that of a circle, but it will never have the same area as that of a circle.</p> <p>I think that if you even look at my experiment logically, it makes sense that the polygons with the most sides had the largest area, but my data proves this mathematically. My project was successful, and I am thrilled at the knowledge and experience I have acquired from doing this.</p> | |
| Summary Statement This project tests how the number of sides in a regular polygon with a fixed perimeter affects its area. | |
| Help Received Parents and grandfather offered moral, transportational and financial help, teachers offered guidance and support, classmates helped and also endured this process. | |