



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Noah M. Toschi	Project Number J1415
Project Title Proof: The Area of the Arbelos	
Abstract Objectives/Goals My objective was to prove that the area of the circle with diameter CD is equal to the area of the arbelos. Methods/Materials All I needed was a pencil, a couple pieces of paper, a straightedge ruler, and a compass (the one used for drawing circles). I then drew the diagram of the three semicircles with the two smaller ones inside the larger one and labeled the three points made by the semicircles A, B, and C. After that, I drew a point directly above point C and called it D; I also drew three line segments, from point A to point D, point B to point D, and point C to point D. Next, I drew a line tangent to the two smaller semicircles. Then, I used the points of tangency of the small semicircles, point C, and point D to draw a circle with diameter CD. Finally, I calculated the area of the circle and the area of the arbelos and compared them. Results After many computations, I found the area of the circle with diameter CD to be equal to the area of the arbelos. Conclusions/Discussion I learned from this experience that the arbelos can be used in structural drawing and architecture. If you draw two vertical lines that pass through the centers of the two smaller semicircles and through the entire diagram, you will make three sections of the diagram; then you can take out the middle section and put the remaining sections together, which would then form a pointed arch. This situation can only occur when the two smaller semicircles are the same size, because when the middle section is taken out and the two remaining sections come together, the halves of the two small semicircles would be symmetrical and form a perfect semicircle.	
Summary Statement My project is a proof on the area of the arbelos.	
Help Received My math teacher and my science teacher helped me find this topic.	