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The objective of this research is to investigate numerical solutions of several boundary value problems for the Helmholtz equation for the shape of a Biconcave Disk. The boundary value problems this research mainly focuses on are the Neumann and Robin boundary problems. The Biconcave Disk is a closed, simply connected, bounded shape modified from a sphere where the two sides concave toward the center, mapped by a sine curve. There are some numerical issues in this type of analysis; any integration is affected by the wave number k , because of the oscillatory behavior of the fundamental solution of the Helmholtz equation. This project was funded by NASA RI Space Grant and the NASA EPSCoR Grant for testing of boundary conditions for the Biconcave Disk. This method has already been investigated for the sphere, ellipsoid, superellipsoid, and the oval of Cassini. The primary purpose of this research is to extend those known results to the Biconcave Disk with calculating the possibility of this shape acquiring sufficient conditions to be part of a spacecraft that might one day land on planet Mars. (Received September 10, 2015)