1056-BF-1225 **Tamara B Veenstra*** (tamara_veenstra@redlands.edu), 1200 E. Colton Avenue, Department of Mathematics, University of Redlands, Redlands, CA 92373. *Paper Folding, Orders of Elements, and Binary Representations of Fractions.*

Many origami designs begin with instructions to divide a piece of paper into 5ths, 7ths, or other nths. Since traditional origami does not allow the use of a ruler or any device other than the paper itself, this might seem impossible. However, the Fujimoto technique is an ingenious method to approximate 1/nth of the paper for any odd n using only the given piece of paper. In the easiest case for paper folders, this technique sometimes produces crease lines at all multiples of 1/n, thus completely dividing the paper into nths. At other times, applying this algorithm produces crease lines at only some of the multiples of 1/n requiring the folder to do more work to completely divide the paper into nths. This paper will describe some mathematics, primarily number theory, underlying the Fujimoto method. As a consequence we will see how origami highlights a well-known connection between binary representations and arithmetic mod n. We will also generalize this connection to any base producing different (albeit impractical) methods of finding 1/nth of the paper. (Received September 21, 2009)