BRIDGES
Mathematical Connections
in Art, Music, and Science

Sona Sand Drawings and Permutation Groups

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Abstract

We will examine sona sand drawings (as presented in the work by Paulus Gerdes [1]) and the conditions that guarantee monolinearity – the property that the curve can be traced in one continuous motion. In particular, we will discuss plaited mat designs and generalized lion's stomach designs. We will associate words from permutation groups with these designs and use reductions of these words to determine the number of curves needed to complete the design. We will show how a generalized lion's stomach design can be associated with a sequence of rotations and flips of a regular polygon. Finally, we will explore how this work can be extended to mirror curves in general.

References

[1] Paulus Gerdes, *Geometry From Africa: Mathematical and Educational Experiences*, Mathematical Association of America, 1999.