

Dividing Land Problem – Student Worksheet

Consider the following scenario:

Two brothers are part of an expedition and they have discovered a new island. From the sky they notice that the island is shaped like an irregular convex quadrilateral. They are not sure of the actual dimensions of the island, but they want to determine a way that they can fairly divide the island between the two of them (problem similar to that found in *Exploring Geometry with The Geometer's Sketchpad*, Key Curriculum Press, 2012).

The older brother suggests that they divide the land along one diagonal. Then, each can have one triangular part. He states that because this method creates two triangles and each will receive one of the two triangles, it is fair.

1. Do you think the two brothers should use this method? Explain why.
2. If the island was of a particular shape, would you suggest using this method? Explain.
3. Use a Dynamic Geometry Environment (e.g., [Web Sketchpad](#), The Geometer's Sketchpad, [Geogebra](#)) to determine another method for dividing the land fairly between the two brothers. Be prepared to explain why your method works.
4. Suppose the brothers want to make sure they each have land that is on the water. Devise a method that will satisfy each brother. Be prepared to explain your solution.
5. While considering various methods, the younger brother noticed that if you create the diagonals of the quadrilateral, measure the areas of each of the triangular regions created, and then multiply the area measures of the two non-adjacent triangles, the products are equal. Is this relationship always true? Explain.