THE OHIO STATE UNIVERSITY

Triangle-based Explorations

Module 5

Mathematics Teaching Institute, July 27-31, 2015

Sponsored by Ohio Department of Education

A stick of uncooked spaghetti is broken into three pieces by picking two points independently and uniformly along the stick, and breaking the stick at those two points. What is the probability that the three pieces can be assembled to form a triangle?

What parameters need to be defined in order to form a triangle with the three segments?

- Classification of problems is not a productive way of thinking about instruction.
- Problem-solving tasks can become accessible to all children if different approaches and techniques are used.
- Technology affords the space for conjecturing and testing so students can draw their own inferences.

Extension:

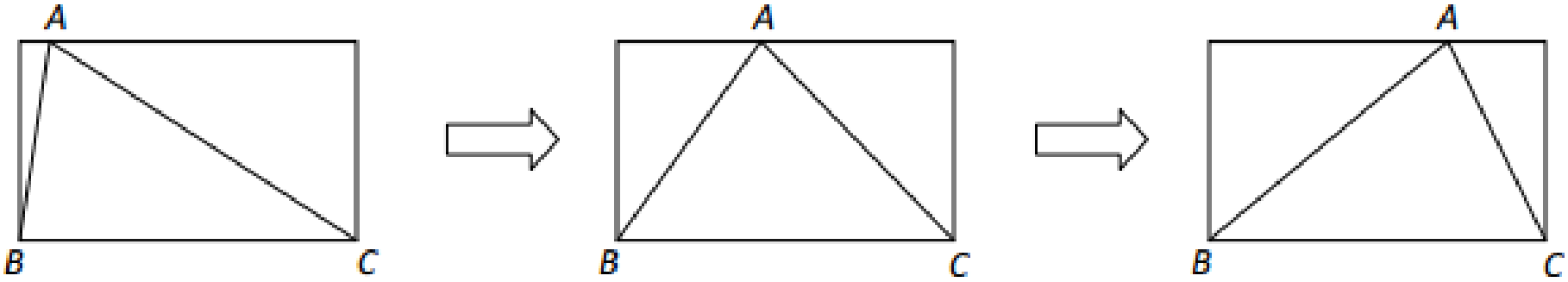
Given three random points on a circle, what is the probability that they lie in the same semicircle?

Extension:

Three legs are positioned uniformly and independently on the perimeter of a round table. What is the probability that the table will stand?

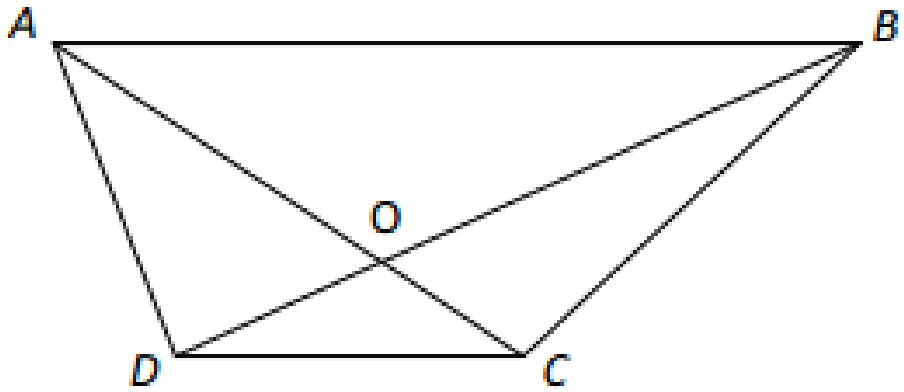
Consider the following questions:

The area of the rectangle is 1 square inch. Describe how the area of triangle *ABC* would change when *A* moves along the side of the rectangle.



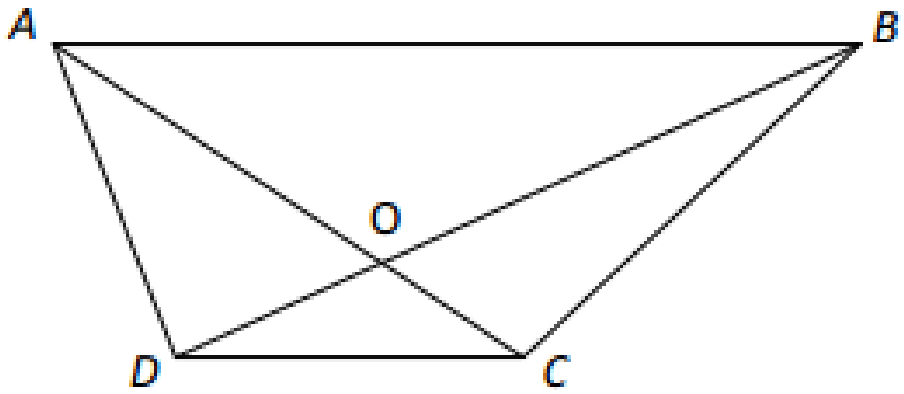
Student Work Sample

ABCD is a trapezoid with *AB* parallel to *DC*. The diagonals *AC* and *BD* intersect at *O*. Make a few conjectures about the four triangles formed inside trapezoid *ABCD*. Explain how you arrived at these conjectures.



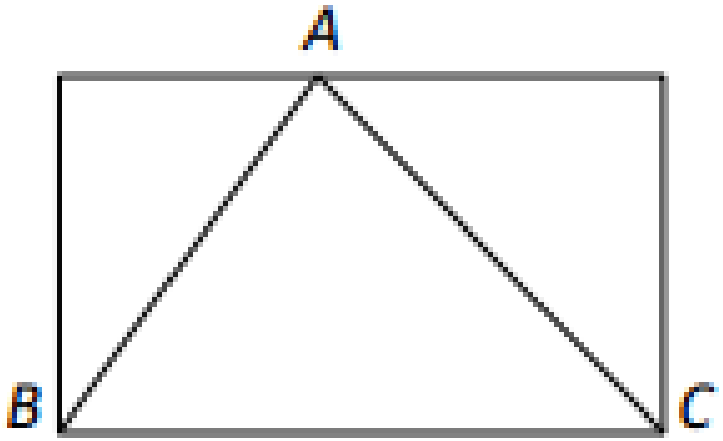
Student Work Sample

Dinglei claims that ΔCOB and ΔADO have the same area, and ΔDOC and ΔAOB are similar. However, she does not provide an explanation for her claims. Offer an explanation for why you believe she is right or wrong in each case.



Student Work Sample

The area of the rectangle is 1 square inch. Assuming ΔABC shares the side BC with the rectangle, and vertex A of the triangle remains on the opposite side of BC, is it possible for the area of ΔABC to be larger than one half of the area of the rectangle?



Student Work Sample