1123-53-286 **Jason Cantarella**, **Thomas Needham** and **Clayton Shonkwiler*** (clay@shonkwiler.org), Department of Mathematics, Colorado State University, Campus Delivery 1874, Fort Collins, CO 80523, and **Gavin Stewart**. *What's the probability that a random triangle is obtuse? or: What the heck is a "random triangle", anyway?*

"Three Points are taken at random on an infinite Plane. Find the chance of their being the vertices of an obtuse-angled Triangle."

This is the text of Lewis Carroll's Pillow Problem #58, from 1884. Of course, the obvious probabilistic interpretation of the problem is invalid, since the uniform distribution on the plane is not a probability measure. Various authors have solved the problem when the points are taken from a Gaussian distribution, or uniformly from some bounded, convex domain, but this seems unnatural: surely the problem Carroll is getting at is that of choosing random *triangles*, not random points.

As Stephen Portnoy observed in 1994, the problem of choosing random triangles is problematic largely due to the apparent lack of a natural transitive group action on the set of triangles. In this talk, we show how to construct a measure on the set of triangles with exactly such an action by identifying triangle space with the projective plane. We can then give a precise answer to Carroll's question and indeed answer a number of related questions about planar n-gons. This approach also generalizes to random polygons in space, a subject near and dear to Ken Millett's heart. (Received August 29, 2016)