1154-J5-1312 **James Stuart Tanton*** (tanton.math@gmail.com), 5033 E Turquoise Ave, Paradise Valley, AZ 85253. *Seriously: Why is negative times negative positive? Reflections on a META-Math annotated lesson plan.*

Here's an age-old question: Why is negative times negative deemed positive?

The universal "inner workings" of arithmetic in school mathematics are often overlooked. School students are usually presented with different ad hoc models to motivate various arithmetical operations—the product of negative numbers, the distributive property of multiplication over addition, for instance—and the idea that there are fundamental common structures to these models is buried. It is not until an advanced undergraduate course—perhaps an Abstract Algebra or a Proofs course—that students are invited to explore the questions of why arithmetic works the way it does.

But can our undergraduates, masters of ring and field operations, explain why the product of two negative numbers is sure to be positive in the real number system? Can they themselves answer the age-old question?

In this presentation we outline one annotated lesson plan developed MAA's META Math, the "Mathematical Education of Teachers as an Application of Undergraduate Mathematics" project. This project works to create undergraduate curriculum materials that highlight secondary-level mathematics teaching as a valuable, if not vital, application of undergraduate mathematics. (Received September 14, 2019)