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Vignette of doing mathematics: A meta-cognitive tour of the production of some elementary mathematics.

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Summary: My intention is to offer the reader a first hand and accessible account of the generation of an interesting and elementary piece of new mathematics and to give the reader a palpable and authentic, yet accessible, image of what it means to do mathematics. The mathematics itself, while of some modest interest, serves here mainly as context, or backdrop. The main story is the metacognitive narrative of the mathematical trajectory of the work. Several features of the event recommend it for this purpose. First, the initial question grew from a topic in the elementary mathematics curriculum, in the teaching of fractions. The mathematical work illustrated here is launched by asking a “natural question” that is precipitated by this elementary context. From that start, explorations, discoveries, and new questions proliferate, some within easy reach of the standard repertoire of the school curriculum, perhaps mobilized in some novel ways, and others seeming to demand some new idea or perspective or method. But, importantly for our present purposes, the ideas and methods invoked never transcend the reach of a secondary learner who is prepared to think flexibly about some less familiar ways of combining elementary ideas.

Classification: E20 E40 E50

Keywords: conjecturing; proving; foundations of mathematics; mathematical inquiries