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Designing and Implementing Lessons That Connect Undergraduate Mathematics to Secondary Teaching

Teaching mathematics requires both content knowledge and pedagogical knowledge. The line between these two realms, however, has become increasingly blurred as researchers continue to identify and describe how mathematical content knowledge is used by practicing teachers in their classrooms. Of particular interest are the ways that secondary mathematics teachers use advanced content knowledge to enhance their pedagogy, and how undergraduate mathematics courses can deliver this advanced content knowledge in such a way that highlights its potential uses in a secondary school classroom. The META Math project has created a number of lessons for undergraduate courses that incorporate connections between advanced mathematics content and teaching activity at the secondary level. I discuss the design principles used to create these lessons, provide examples of the applications to teaching that they highlight, and examine the outcomes of the lessons' implementations in terms of both student work and instructor feedback.