

ZMATH 2008f.00349

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Algebraic formulas, geometric awareness and Cavalieri's principle.

Learn. Math. 28, No. 2, 17-24 (2008).

From the introduction: The starting point for this article is an exploration of the complex set of connections between algebraic formulas and geometric awareness, in particular the limited extent to which the latter is either embedded in or necessary for the former. We do so within the core school mathematical topic of area (and, to some extent, of volume), but we wish to go beyond what is now explicit in curriculum documents of various countries, namely that such formulas should be motivated or even proven using geometric arguments. One complaint in relation to this minor move (as we see it) is that it leaves unchallenged the prominent place taken by formulas themselves as the primary or even sole goal of teaching and learning about area and volume. We wish to examine a possibly unfamiliar way (namely Cavalieri's principle, our mediating third of the title) of staying with the geometry on its own terms. In doing so, we take seriously Tahta's formulation that "the geometry that can be told is not geometry", noting that area and volume formulas are unreservedly about such tellings. The moment the word "measure" is uttered, the instant that variables are deployed, geometry has vanished (despite the etymological origins of the word itself).

Classification: G40 G30 A30

Keywords: plane geometry; solid geometry; rectangles; parallelograms; transformations; Cavalieri-equivalence; prisms; pyramids; cubes; cylinders; Cavalieri transformations; arithmetisation of geometry