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Reasoning, communication and connections in A-level mathematics.

Kaur, Berinderjeet (ed.) et al., Reasoning, communication and connections in mathematics. Yearbook 2012, Association of Mathematics Educators. Hackensack, NJ: World Scientific (ISBN 978-981-4405-41-6/hbk; 978-981-4405-43-0/ebook). 127-147 (2012).

Summary: After the curriculum review in 2006, the Singapore school mathematics framework expanded its scope to include reasoning, communication and connections as three main components of the processes of problem solving. This new emphasis should pervade all levels of mathematics learning: primary, O-Levels and A-Levels. As A-Level students have learnt sufficient elementary mathematics at the O-Level and are preparing for tertiary education, this emphasis on reasoning, communication and connections is not less important than at the O-levels. In this chapter, sample activities of how reasoning, communication and connections can be infused into teaching various A-level mathematics topics are discussed. For mathematical reasoning at the A-levels, elementary mathematical proofs and derivation of results by first principles are good opportunities to transcend procedural emphasis of traditional teaching to higher level mathematical reasoning. Connections can be achieved by several means: facilitating students to connect across different mathematical ideas, across other disciplines and to daily life. Connections help students to better understand and appreciate various mathematical concepts and enable them to regulate their own thinking (meta-cognition). Teachers should provide opportunity for students to communicate their reasoning clearly, and formulate their argument during mathematics lessons.

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