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Varieties of mathematical understanding:

Abstract

'Understanding' has been characterised in quite different ways both by mathematicians and philosophers of mathematics. These characterisations focus on different components of mathematics as well as a variety of aspects or qualities of understanding such as unification, abstraction, visualisation and mechanisms. They also differ in terms of claims of "temporality", e.g., whether 'understanding' is considered as a static or dynamic notion. Besides presenting some examples of the above-mentioned characterisations of mathematical understanding, I will propose a general framework to analyse these contributions. Overall, I take understanding to be a relation between an (idealised) agent and (a selected part of) mathematics. It further seems that our wish to understand is associated with some other purpose; e.g., we wish to understand with the intent to developing new results. In addition, there are the mentioned qualities of understanding and considerations of temporality. I will present part of this analysis and try to extract some possible patterns. In general, it seems that 'understanding' is understood in quite different ways in the practice of mathematics.