Can mathematics be taught in a Christian way?

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1. Introduction

Some people would argue that mathematics cannot be taught in a Christian way. Others would say it can be done, but that they are unsure how to do it, and therefore do not do it. Some methods mentioned from time to time will be briefly discussed in this address. The question will be asked whether these techniques bring one closer to a Christian perspective on mathematics.

My view is that some of these methods are just not sufficient and that more should be done. More attention should be paid to the context in which a mathematical subject is imbedded. Attention should be paid to matters such as the history of mathematics, mathematical laws and more general scientific laws. More attention should also be paid to the context between mathematics and nature in general. Finally and most importantly, attention should be paid to the contextual connection between mathematics and religion.

2. A Christian perspective on mathematics?

From time to time the following proposals (or variations thereof) are mentioned when the question of a Christian perspective on mathematics in a class is raised.

A Christian perspective on mathematics can be attained by the attitude of the lecturer or teacher in class – including such matters as his/her friendliness and helpfulness. (However, this raises the following question: Could an atheist not also be friendly or helpful in class?)

- A Christian perspective on mathematics can be attained when the teacher or lecturer inserts a Bible verse or other Christian saying at the beginning or end of the class notes. (Then the question is of course whether anything is in order, as long as it is concluded with an expression such as *Soli deo gloria*?)

- A Christian perspective on mathematics might perhaps be attained by attaching one or more Bible verses to a mathematical entity. (For example: In 1 Kings 7:23 one reads: *Then he (Solomon) made the molten sea; it was round, ten cubits from brim to brim ... A line of thirty cubits would encircle it completely".* But does this verse really give a Christian perspective on the value of □?)

- A Christian perspective on mathematics might be hidden in the beauty of the subject, particularly in the structure of the mathematical theory that is being studied. (Would it in the case of Aristotle, as an example, lead to a Christian perspective on his mathematics if he says the following (as reported by Davis and Hersh (1981:168)): "The mathematical sciences

particularly exhibit order, symmetry and limitation; and these are the greatest forms of the beautiful"?)

All of us would agree that one should be friendly and helpful in class, and that one should also talk about the beauty of one's subject. I am not saying that these things should not be done. What I am saying is that it is surely not enough!

These ideas are not the only ones. The following are also mentioned from time to time when it comes to the question of a Christian view on mathematics. Also in these cases, I am not saying that these things should not be done. What I am saying, is that in itself it is not sufficient:

a. *Look for misformulations or misinterpretations in the textbook.* The view is that one should take specific note of any formulation or expression that does not conform to one's Christian view. For example: "Kepler's laws *govern* the motion of a planet in its elliptic orbit around the sun". Of course this should be done, but my comments are the following:

   - It places too much emphasis on negative aspects,
   - it is too arbitrary and does not give a method by means of which one can continuously pay attention to the Christian perspective on mathematics, and,
   - it does not (in the case of this particular example) touch on the question of whether laws are man-made or God-given. For example: is the movement of the planets according to Kepler's laws or according to God's laws?

b. *Look for reductionistic views in the subject*. In science there is always the trend to reduce the different aspects of the real world (for example the arithmetic, the spatial, the physical-chemical, the biological, the esthetic, the ethical) to one another. In this way the real world is reduced to one or two aspects. Therefore, be on the look-out for such trends. For example: a biological being is nothing more than atoms. This viewpoint could be useful, but I would also like to stress the following points:

   - Again too much emphasis is put on negative matters.
   - Again it is too arbitrary and does not give a method by means of which one can continuously pay attention to the Christian perspective on mathematics.
   - Not every subject is suitable for such a discussion – and I am not so sure that mathematics can have reductionistic trends.

c. *Look at the theories that form the basis of the subject*. Botha (1993:106) is of the opinion: "For Christian scholars to develop a philosophic-foundational answer with respect to the philosophical ideas in their scientific theories, it is necessary to develop a Christian-philosophical system in which the foundational questions are answered in principal." While there is also nothing wrong with this view, I do have the following comments:

   - Again too much emphasis is put on negative matters.
   - It is also too arbitrary and does not give a method by means of which one can continuously pay attention to the Christian perspective on mathematics.
   - The meaning and structure of a theory is not the same in every subject. Every mathematician knows that the structure and development of a mathematical theory cannot be compared with that of a biological theory, for instance a theory on evolution. Due to its

deductional character, a mathematical theory has in a sense a greater "certainty" than a theory that is based on induction.

3. **A Christian perspective on mathematics!**

Having made these comments, the following questions still remain:

- Is there such a thing as Christian mathematics?
- Can one have a Christian perspective on mathematics?
- Can mathematics be taught in a Christian way?

My answers to these questions are as follows: No, there is no such a thing as Christian mathematics; and also no such a thing as unchristian mathematics. Yes, one can have a Christian perspective on mathematics. And yes, mathematics can be taught in a Christian way. As Christians, it is our calling to teach mathematics in a Christian way from a Christian perspective.

If I say there is no such a thing as Christian mathematics, I mean it in the same sense as saying there is no such a thing as Christian musical scales (or, for that matter, a Christian theory for the construction of musical scales). One system of musical scales may differ from another (for example Western and Eastern musical scales), but one cannot say that one is more "Christian" than the other. In the same sense one melody cannot be more "Christian" than another. Of course, if words were added to the music, one song might be more Christian than the other. In the same sense one can perhaps raise objections to the use of mathematics in designing an atomic bomb, but the calculus that is used to build the mathematical model or the numerical analysis that is used to solve the problem is neither "Christian" nor "unchristian".

Concerning the second and third questions posed, my view is that one can have a Christian perspective on mathematics and that mathematics can be taught in a Christian way. I would like to discuss these statements and the method I use in my classes in the next part of my address.

4. **The view of science in context**

My first point of departure is that one's whole life is religion and that there is no part of one's life that can actually be called "secular" (Fowler, 1981:7). This of course also includes mathematics. With this I mean that mathematics should in a sense be viewed as part of one's religion.

My second point of departure is the *view of science in context*. By this I mean that science, and specifically mathematics, should be viewed *in context* and not outside of it (Stoker, 1976:138; Geertsema, 1987:158; Geertsema, 1992:1). In contrast to the view of the logical positivists (that is, the so-called *standard view of science*), my view is: All aspects of one's subject should be viewed in context with other, wider aspects, such as the history of mathematics, the laws of science, science in general (with its different viewpoints and paradigm shifts), nature and religion.

The following remarks about the viewpoint of *science in context* can be made:

a. The science in context point of view gives a wide view of science. Seen as a wide activity, people of different points of view will view science differently, but when it comes to the details of the subject, there will usually not be differences. That does not mean that science as such is neutral, or postmodernistic, because the activities are related to the contexts, and that cannot be neutral.

b. The science in context viewpoint can be vizualised as a point (the details of the subject) with some circles (the contexts), surrounding it, and also with some connection lines between the circles. Some contexts (such as the historical context for example), may even cut through the others.

c. The science in context viewpoint gives a handy framework for discussion in class. It can be used in a continuous, well-planned manner for a weekly of bi-weekly class discussion, without being artificial or arbitrary.

I use the following contexts in my classes, although of course there is no reason why these should be the only ones to be discussed, or why it should even be discussed in this order.

- The historical context
- The context of mathematical theories and relationships
- The context of science and society
- The context of the real world (nature)
- The religious context.

I would like to give the following example of a typical mathematical course:

a. *Introductory*: What is mathematics? Is it possible to study this particular mathematical course from a Christian point of view? Man's life always in God's service. Science in context and the viewpoint of science in context as basis for a class discussion.

b. *The historical context*: Some historical aspects regarding the subject. Some foundational matters from history. Some paradigm shifts, if any, from history.

c. *The context of mathematical theories and models*: What is a theory? Induction and deduction in science and mathematics. Mathematical induction. Scientific models; models not equal to reality.

d. *The context of science and society*: Different scientific views: positivism, logical positivism, modernism, post-modernism, etc (if applicable). The "power" of science. The idealization of science and mathematics. The ethics of mathematics (if applicable).

e. *The context of creation*: Different world views (also concerning mathematics). The beauty of our world.

f. *The religious context*: The science/theology debate. The beauty of God's creation. Can mathematics become one's idol/religion? Psalms 8 and 19. God as sustainer of His creation.

I would like to conclude with the following practical hints:

- Class discussions of this nature should not be too difficult – for either the lecturer, teacher or student.

- These discussions should be used regularly, and should not be too long.
- If desired, start off with the historical context. On its own it does not necessarily provide a Christian perspective, but at least it provides a fairly simple starting point.
- The discussion of these five contexts, together with an introductory discussion, could be fitted into a term of twelve weeks with a brief discussion lecture more or less every second week. It might be a good idea to do some planning (for example exact dates and contents) at the start of the term already.
- If one or more of the contexts could be joined to a specific part of the mathematical course, so much the better, but it is not always easy to accomplish that.

5. Summary

Typically, the details of any subject in the exact sciences – such as mathematics – as lectured by a Christian and by a non-Christian, would not differ. The difference, however, would rather be in the different contexts which are related to the subject under discussion. That is exactly what I have tried to illustrate. I believe that in this way I can fulfil my calling of teaching my scientific work in the light of God's Word, in the words of Psalm 36:9 (which is also the motto of my university): *In your light we see light* (New Revised Standard Version).

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