What is Mathematics?

This is a question that I have been asked countless times in my twenty five-plus years of working in mathematics. Normally a one-sentence answer is all that is expected. How does one summarise in at most two sentences the richness and complexity of one of the great cultural and technical achievements of humanity?

A recent motivation for further considering this question was the process of considering sixty mathematicians for one lecturing position. There was a vast range of areas of interest and experience but they were all mathematicians. What is a mathematician? Is this a person who does mathematics?

How do you answer in one sentence: What is Mathematics?

I'd like to collect as many answers as possible from the mathematicians of the world (or at least Australia). Take the time to send me your one or two-sentence answer. I hope to collate the answers and report back in a later edition of this journal. No names will be mentioned, so all answers will be anonymous, except to me.

Please send your one sentence NOW, or at least by the end of August 2005 to Ian.Roberts@cdu.edu.au preferably labelled "What is Mathematics?"

Perhaps some of us additionally would like to provide a fuller answer. If that is the case then please send it as well, and depending on the interest in the topic we might build upon that. In this case please nominate if you wish for this to remain anonymous.

I have developed my own one-sentence answer, which is currently my secret – I think it is interesting to get a range of fresh views from a number of mathematicians.

We are all unique, we all work in different sub-disciplines, we are all motivated to work in and enjoy mathematics for different reasons, and we have all succeeded in different ways.

The question is very relevant in our current tough times. What is it that we spend so much time doing, that we succeed in doing, and that we think is so important? What is it that students are missing at school if they are not taught mathematics, or not taught it well — and what does "taught it well" actually mean? What is the subject that we have chosen, that we think is under-funded, that we think is under appreciated, and which we see in decline across the country? What is it that many Australian Universities have been cutting or trimming but which constitutes some of the largest disciplines in many international universities?

Recently I happened to hear a Federal Member speaking in Parliament and lamenting the decline in the quality of political comment in the media. I listened intently when he attributed some of this decline to the decrease in people studying logic, philosophy and mathematics. He claimed figures around the following values: twenty years ago there were 100 000 students across the country in these disciplines and now there are 20 000 students. Unfortunately a recent web search of Parliament and Hansard has not allowed me to find the exact speech and clarify the details.

My personal views have evolved through experience and interest. I began in functional analysis, where "anything finite dimensional is trivial", and I now work mainly

in finite and discrete mathematics (Set Systems, Extremal Set Theory, Combinatorial Design, Search Theory, Hypergraphs, Combinatorics . . . what is the name of my pigeonhole?). My associated interests include Mathematics Education and Theoretical Computer Science.

Will my one-sentence answer satisfy you?

The Australian Pocket Oxford Dictionary (1986) states "mathematics . . . science of space and number in the abstract . . . or as applied to physical research". Does this satisfy you or anyone who might ask you the question?

The editors of this journal touched on this topic in the Editorial of the last issue of 2004 whilst celebrating the event! They used more than one sentence. What would be their two-sentence answer?

Will your answer satisfy others or be meaningful to them without having had your experiences?

I suspect we will need many one-sentence answers that may just convey some sense of who we are! Lets see if we can get some answers — over to you!

In this same edition of the Gazette there appears an interesting article by Patrick D. Bangert, *What is Mathematics*? The appearance of this article is coincidental but not surprising — we should all be interested in and concerned about our fascinating and sometimes threatened discipline. I hope that the replies received to this short article will be a light complement to Bangert's quest as expressed in his paper.

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