13 D PHILOSOPHY OF MATHEMATICS

The structure of mathematics points to an orderly universe, which suggests intelligent ordering. Similarly, the repeatability of all parts of math ties to God's faithfulness in upholding all things.

It is when we look at the philosophy of mathematics, says Bishop, [1] that we find huge disagreements (depending largely on underlying worldviews) and lack of neutrality. To what extent is math invented and to what extent are its foundations discovered?

Three major philosophical schools have emerged regarding the nature, meaning, and source of mathematics: [2]

1. Nominalist, including functionalist
   Mathematical systems are an internal formal language with no necessary contact with reality.

2. Intuitionist
   Mathematical concepts exist in the minds of those dealing with them.

3. Realist
   Mathematical entities exist in the real world.

It appears clear that basic arithmetic (counting, adding and subtracting, multiplying and dividing, fractions) arises from real quantities. Geometry and trigonometry seem to have a basis in nature. Extensions and abstractions, such as Riemann geometry, complex math, and topology arise from mental activity as extensions from real-world mathematics.

Theory	Advocate or founder	Mathematics is fundamentally based on-
Realism/ Platonism	Plato	Entities in the physical world
Logicism	Bertrand Russell Gottlob Frege	Pure logic

Intuitionism	L.E.J. Brouwer Hermann Weyl	Concepts developed in our minds
Constructivism (a branch of intuitionism)		
Formalism	David Hilbert	Formal structure of mathematical language or axioms

Euclid obviously believed the lines, circles, etc. he described were those of the real world and so his mathematics was a description or codification of the nature of the universe…It seems fair to say that most mathematicians – at least those from Western traditions – believed that they were discovering truth about the universe and that intuition, science and mathematics were all different views of the same thing – reality.

The Bible sees being able to number things as giving some sort of power over them – the importance is shown by the way all sorts of things get counted from people to drinking vessels. David gets into trouble when he counts the Israelites in 1 Chronicles 21 which seems to be because he is abrogating God's right alone to know this. In the New Testament we hear from Jesus that the 'hairs of your head are all numbered' (Matt 10:30).

Things that could not be counted – such as the stars, the clouds or the grains of sand – are used to express the restricted nature of man's mind and contrast it with God's omniscience. When God is promising Abraham lots of descendants he compares them to the stars, which Abraham cannot count. However in Psalm 147 God knows the number of the stars and his understanding has no limit (literally 'no number'). So too in Job 11 Zophar asks Job the rhetorical question "Can you probe the limits of the Almighty?" [3]

Physicist Max Tegmark believes that there is an external reality but that it is not necessarily personal. Fundamentally, he suggests, the universe is mathematical. [4]

Poythress adds-

In all this discussion we are really raising, in another form, the old problem of a source for ultimate metaphysical unity in the world, in this case the unity of truth. On the Christian basis, we hear a very simple and clear-cut answer: God knows everything, and His wisdom guarantees that truth will not be overthrown by the next fact around the corner. He has made man in His image in such a way that man can know truth ("think God's thoughts after Him") without having to know everything.

The sciences find their unity in the personal Wisdom of God (Ps. 104:24). "He is before all things, and in him all things hold together" (Col. 1:17). This is why mathematics applies to physics. This is why the fundamental laws of physics have such simple form. We trust that mathematics will continue to find application to physics, not because of blind faith (§17), but out of the conviction that the laws of physics and mathematics are simply two diverse ways in which Christ comprehensively rules the universe.

First, God reflects his glory in the harmony of three main realms involved in mathematics. The three realms are (a) the world around us, (b) our own minds, and (c) the truths of mathematics as general truths. For mathematics to make sense and to be reliable, we have to have a harmonious relation among the three realms. Without the world, there is no application. Without our minds, there is no one to think the mathematics (well, no one except God). Without the truths, there is nothing to think about or to apply…

The three realms of mathematics are in harmony because God specified all three. He specified the world by speaking it into existence. He specified our minds by making us in the image of God, so that we as creatures can imitate his own mind. He specifies the truths of mathematics, because he himself is the truth. The three are in harmony because they all come from God. And everyone depends on it all the time. [5]

Creation and Mathematics

The point is that even the most elementary mathematical content involves an intrinsic commitment to a certain vaguely defined philosophy or world view. Every mathematician must have it to get off the ground. This vague world view assumes, among other things, that the world "makes sense" or that it "hangs together." Reality is not a complete flux, and man's mind is not a complete flux. What happens is not completely random and without sense. Man's mind, logic, and external reality cohere.

Whichever answer a person on the anti-theistic side chooses ((all knowledge from reason or experience)), he is bound to land himself in difficulties. Suppose that one emphasizes the a priori character of mathematical knowledge. Then '2 + 2 = 4' is some kind of universal, eternal truth. But why, in that case, should two apples plus two apples usually, in experience, make four apples? Why should an admittedly contingent world offer us repeated instances of this truth, many more instances than we could expect by chance? If the external world is purely a chance matter, if anything can happen in the broadest possible sense, if the sun may not rise tomorrow, if, as a matter of fact, there may be no sun, or only a sputnik, when tomorrow comes, if there may be no tomorrow, etc., can there be any assured statement at all about apples? Why, for instance, don't apples disappear and appear randomly while we are counting them? If, on the other hand, the external world has some degree of regularity mixed in with its chance elements, why expect that regularity to coincide, in even the remotest way, with the a priori mathematical expectations of human minds? Such questions can be multiplied without limit. Once one has made the

Cartesian separation of mind and matter, of a priori and a posteriori, one can never get them back together again. [6]

Jason Wilson adds:

As soon as you believe in numbers, then you're believing in this abstract thing that has no material substance. And you're already pretty much believing in an absolute truth.. "Since the creation of the world, God's invisible attributes, his eternal power and divine nature have been clearly seen through what has been made so that they are without excuse." (Rom. 1:20) Invisible nature, eternal power… These again are things that we don't see, but yet they're there. And those are manifested, not only in the physical world through the sciences, but in this abstract world of the math, that we're doing math and it works. And that again points to this God that has this invisible nature.

I think that a pretty good argument can be made for theism. To pass from theism to Christianity, there's just a gulf, and I've thought about this question quite a bit. There's an author by the name of Alvin Plantinga, wrote an essay called "Theism and Mathematics," and he makes an interesting point. He says that there's perhaps four different kinds of world that we could conceive of.

One would be atomless gunk, is pretty static. You could have mathematical descriptions; they'd be boring. Number two, you could have this chaotic world that, I mean I'm talking full-on chaos. You could just imagine maybe the lights just go out, maybe ID materialize, maybe show up part of me across the room, I mean full-on chaos. There's no order whatsoever, no mathematical description possible. Again, that's just weird.

You could have another world where it appears chaotic like I just described, but there's a deep underlying order that's impenetrable to humans. Again, that's not going to be interesting to us. Or you could have a world that is dynamic, but yet there is this underlying order that can be understood. And that's the one that we live in.

Now, a theistic worldview explains that well because there's a design. The naturalistic worldview has trouble explaining why that particular one. Plantinga is going to point out another argument that he calls accessibility. And that is, why is it that humans can penetrate some of this underlying order, but yet it takes a full effort. There's a search required. It's at the upper limit. It's taken us centuries to get where we're at. [7]

What of the postmodern approach to mathematics? Howell and Bradley make this analysis:

The postmodern attack on the modern view of the nature of mathematics is concentrated in the following aspects… Deny the long-standing view called mathematical realism (or Platonism) that holds that mathematical entities like numbers, functions, structures and the like exist independently of us… Deny the correspondence theory for the truth of propositions. The correspondence theory says that the way one describes the truth of everyday propositions applies

to mathematical propositions. Thus a mathematical proposition is true if and only if it says of what is the case that it is the case. The mathematical realist would be inclined to affirm a correspondence theory while anti-realists would tend to see propositions as having a validity that depends on cultural context… [8]

References

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