THE PROBLEM
OF MATHEMATICS

How can it be that mathematics, being after all a product of human thought which is independent of experience, is so admirably appropriate to the objects of reality?

Albert Einstein (1920)

Why can we use mathematics to describe nature without a mechanism behind it? Nobody knows.

Richard Feynman (1961)

There is one qualitative aspect of reality that sticks out from all others in both profundity and mystery. It is the consistent success of mathematics as a description of the workings of reality and the ability of the human mind to discover and invent mathematical truths.

John Barrow (2007)

Most often now I have the office to myself. Most of the time I read. Though I no longer write for Frank—not as a matter of intent—and don't yet know if my Frank reads me, yet I also write.

In 1905, says Jeans, math overmasters physics. Highbrow eyebrows rise each time math mirrors nature. Einstein said it first but Wigner often gets the credit. He says in 1960 that 'the miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve.' He notes too: 'Fundamentally, we do not know why our theories work so well. Hence their accuracy may not prove their truth and consistency.'

I pluck these few from my long list of those who marvel at and puzzle over physics' practical success with math. Each one admits they do not understand it. Tegmark tries to tie the two together: 'Our external physical reality is a mathematical structure.' He says the universe *is* mathematics. But he can't prove it. He notes that 'the true mathematical structure isomorphic to our world, if it exists, has not yet been found.'

He has me wondering: Why *is* the universe in tune with mathematics? It seems to be a fundamental question. In *Pi in the Sky*, Barrow says it leads us 'into greater mysteries still: What is mathematics? Do we invent it? Do we discover it? Could it be … something immaterial and other-worldly that exists in the absence of mathematicians?'

To whom should I look for answers? Mathematicians? I recall Gödel, who proves some truths cannot be proved. Physicists? I've come to see them as submerged in math so deep they have no vantage point from which to see the view. Philosophers? Do not such questions lodge in their purview? And yet I find them less than well explored. I'm left to scratch this mental itch: If math exists before it is discovered, when *does* it start? Surely it must hail from the Beginning!