From "The Clockwork Universe" by Edward Dolnick, Harper, 2011

p. 95: Mathematicians believe fervently that their work is as elegant, subtle, and rich as any work of music. But everyone can appreciate music, even if they lack the slightest knowledge of how to read a musical score. For outsiders to mathematics – which is to say, for almost everyone – advanced mathematics is a symphony played out in silence, and all they can do is look befuddled at a stage full of musicians sawing away to no apparent effect.

pp. 131—133: For the mathematically minded, the notion of glimpsing God's plan has always exerted a hypnotic pull. The seduction is twofold. On the one hand, delving into the world's mathematical secrets gives a feeling of having one's hands on nature's beating heart; on the other other, in a world of chaos and disaster, mathematics provides a refuge of eternal, unchallengeable truths and perfect order.

The intellectual challenge is immense, and the difficulty of the task makes the pursuit even more obsessive. In Vladimir Nabokov's novel The Defense, Aleksandr Luzhin is a chess grand master. He speaks of chess in just the way that mathematicians think of their field. While pondering a move and lighting a cigarette, Luzhin accidentally burns his fingers. "The pain immediately passed, but in the fiery gap he had seen something unbearably awesome – the full horror of the abysmal depths of chess. He glanced at the chessboard, and his brain wilted from unprecedented weariness. The chessmen were pitiless; they held and absorbed him. There was horror in this, but in this also was the sole harmony, for what else exists in the world besides chess?"

Mathematicians and physicists share that passion, and unlike chess players they take for granted that they are grappling with nature's deepest secrets. (The theoretical physicist Subrahmanyan Chandrasekhar, a pioneer in the study of black holes, spoke of "shuddering before the beautiful.") They sustain themselves through the empty years with the unshakable belief that the answer is out there, waiting to be found. But mathematics is a cruel mistress, indifferent to the suffering of those who would woo her. Only those who themselves have wandered lost, wrote Einstein, know the misery and joy of "the years of searching in the dark for a truth that one feels but cannot express; the intense desire and the alternations of confidence and misgiving, until one breaks through to clarity and understanding."

The abstract truths that enticed Einstein and his fellow scientists occupy a realm separate from the ordinary world. That gulf between the everyday world and the mathematical one has, many times through the centuries, served as a lure rather than a barrier. When he was a melancholy sixteen-year-old, the modern-day philosopher and mathematician Bertrand Russell recalled many years later, he used to go for solitary walks "to watch the sunset and contemplate suicide. I did not, however, commit suicide, because I wished to know more of mathematics."

A deep dive into mathematics has special appeal, for it serves at the same time as a way to flee the world and to impose order on it. "Of all escapes from reality," the mathematician Gian-Carlo

Rota observed, "mathematics is the most successful ever. … All other escapes – sex, drugs, hobbies, whatever – are ephemeral by comparison." Mathematicians have withdrawn from the dirty, dangerous world, they believe, and then, by thought alone, they have added new facts to the world's store of knowledge. Not just new facts, moreover, but facts that will stand forever, unchallengeable. "The certainty that [a mathematician's] creations will endure," wrote Rota, "renews his confidence as no other pursuit." It is a heady, seductive business.

p. 142: No Greek would have asked, "What good is it?" What good is a poem or a play? Would a sculpture be more admirable if it could also serve as a doorstop?