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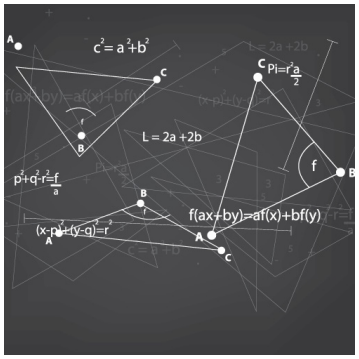
SCHOOL OF EDUCATION



Math Matters

Applying Math to a Higher Power

By: Dr. Arnie Good, Interim Chair
Cambridge College Mathematics Department
Arnold.Good@go.cambridgecollege.edu

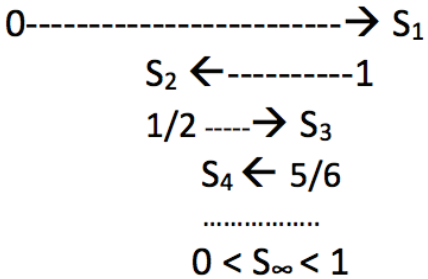
Can we use math to prove God exists? Do we want to? One former student of mine thought it was a sacrilege to even try to do so. But God and math go back a long time. While not dealing with a deity per say, Pythagoras made math a religion, his cult preaching that "everything was number." Leibniz, the co-inventor of calculus, proclaimed that his discovery of its Fundamental Theorem proved God existed – who else could create such a beautiful result? As for Newton, calculus' other co-inventor; he invoked God when he defended the subject against the criticism of an Irish Bishop, in effect saying: it works because God wants it to. (The Bishop correctly pointed-out that calculus requires division by zero, which even Newton would confess was mathematical blasphemy.) In more recent times, after Gödel established that mathematics can never be proven to be consistent, it is all but ordained that God exists, as how else can we be certain no inconsistency lurks within? A devilish thought!

But providing a mathematical proof of God's existence is exactly what we try to do. We begin by investigating the infinite series S = 1 – 1/2 + 1/3 – 1/4 +… 1/n + …. Series of this ilk, according to Abel, are "the work of the Devil." S itself adds to a finite number, while the sum of its terms (sans the minus signs) adds to infinity. S is alternating-harmonic. The Greeks named it "harmonic" supposedly because they believed music was made up of notes of this form. We know better: there are half-notes, quarter-notes but usually not one-third or one-fifth notes. So why "harmonic?" One explanation is that the Greeks (Pythagoras in particular) were tone deaf. That S adds to a finite non-zero number is verified by the diagram in Figure 1. S, without the minus signs, that is: 1 + 1/2 + 1/3 + 1/4 +… 1/n + ….adds to infinity but this is far from obvious as each succeeding term gets smaller. Overlooking the 1 and 1/2, we notice that the next two terms: 1/3 & 1/4 add to a faction greater than 1/2. This is also true of the next four terms: 1/5 + 1/6 + 1/7 + 1/8. And it is true of the next eight. The halves never stop coming and, while accumulating slower and slower, they eventually surpass all positive integer values.

We begin our proof by first by pointing out that in the beginning everything was nothing: 0 = 1. Hence God's first action must be to proclaim: one and zero are no longer the same. How else could he create the world in six days? If 1 = 0, he would have done it in "no time at all." Thus if we establish that 1 = 0, God must exist. Such poofs are common and their flaw easily exposed. I call these decoy proofs.

Our proof is different relying only on the elementary rules of commutativity, associativity, and factoring. Using commutativity, we rearrange the terms of S in the following manner: S = 1 – 1/2 – 1/4 + 1/3 – 1/6 – 1/8 + 1/5 – 1/10 – 1/12 + 1/7 – 1/14 – 1/16 + 1/9 +… Adding brackets, associativity, we get: S = (1 – 1/2) – 1/4 + (1/3 – 1/6) – 1/8 + (1/5 – 1/10) – 1/12 + (1/7 – 1/14) – 1/16 + (1/9 +… = (1/2) – 1/4 + (1/6) – 1/8 + (1/10) – 1/12 + …. Finally we factor out 1/2 yielding: S = 1/2 [1 – 1/2 + 1/3 – 1/4 + ….]. Behold: S =½S.
A miracle? But S is not 0 and we divide both sides by it getting 1 = 1/2. Multiplying by 2 gives 2 = 1 and taking away 1 yields … God?? Shucks "no." This proof too is flawed. Can you find it? Let me know. But remember, I take points off for wrong answers!

Figure 1



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STEM Certificate

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