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THE DAFYOMI DISCUSSION LIST

brought to you by Kollel Iyun Hadaf of Yerushalayim
Rosh Kollel: Rabbi Mordecai Kornfeld

[REPLY TO THIS MESSAGE TO DISCUSS THE DAF WITH THE KOLLEL]

Sukah 008: The mistake of the Judges of Caesarea

Shalom Kelman asked:

I have a theory concerning the mistake of the JUDGES OF CAESAREA. The answer is as easy as 4,3,2 ! I will try to state it below.

The ratio for the areas of the large square, the inscribed circle, and the smaller inscribed square is 4:3:2. The ratio for the perimeters of the same geometric objects is 4:3:2.8. (If the large outside square is a unit square, it's perimeter is 4, the circle circumference is 3, and the inner square is made up of sides equal to .7, [.5 times the 1.4, the square root of 2], thus giving a perimeter of .7 X 4 = 2.8)

The mistake was in drawing an analogy from area to perimeter. Just as in area, the ratio is 4:3:2, they thought the same should hold true for perimeter. Now it indeed is true that the ratio of 4:3 is true for both area and perimeter when looking at the relationship of the larger square and the circle. It is not true for the inner square. Only for area is the ratio 4:3:2 correct. Their "fatal" mistake was to carry the analogy further into the perimeter of the smaller square.

If it were true that the ratio for perimeter is 4:3:2, then the inner square would have sides equal to .5, not .7.

This leads to several other derived errors. For example, the sum of two sides of a right angle triangle would equal the hypotenuse of the triangle, which is false! Specifically, according to their mistake, the perimeter of the inner square is 2, the length of the sides of the smaller square are .5 and the hypotenuse (which is the same as the diameter of the circle) is 1.

Another derived error is the situation of a right triangle with equal sides.

The main point is that by extending the analogy from area to perimeter to include the smaller square, which on the surface seems reasonable, they were led to contradict basic laws of geometry. This type of error is common in young math students and characterized some of the flawed thinking of the ancients (I read this somewhere in a book on the history of math which tried to explain why the Greeks didn't discover calculus).

Hope you like it.

Shalom Kelman,
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