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Squaring the Circle

part 2

by Miles Mathis

First published April 10, 2020

I thought of something last night. Don't know why, since I wrote part 1 on this problem way back in 2006. I thought to ask myself how my replacing of *pi* with 4 would affect this problem. The short answer is: it wouldn't, necessarily, since the historical problem had to do with the **area** of drawn circle. My *pi* papers don't affect area, since area is not kinematic.

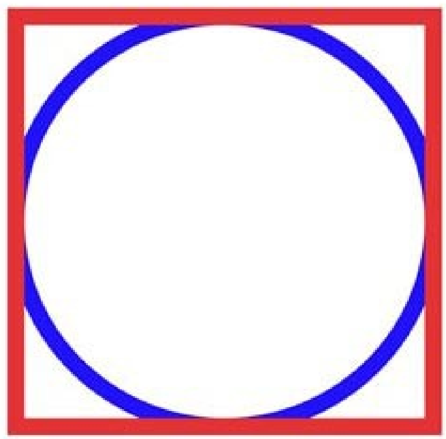
But then it occurred to me to ask myself *why* the historical problem was one of matching the area of a square to a circle, instead of matching the circumference of a square to a circle. That would be an equally interesting problem of construction, one that historically would also include *pi*. Instead of $r^2 pi = s^2$, we would have $2r pi = 4s$. So a square of side 1 would be matched by a circle of $r = 2/pi$. Or a circle of radius 1 would be matched by a square of side *pi*/2. So why was this question always in the form of area?

Also curious is that a square and circle of equal circumference do not have the same areas. A square of side 2 has an area of 4, while an equivalent circle has an area of 16/*pi,* or about 5.1. So if you want to create the maximum area, a circle is the way to go. That helps us understand the orbit, which tends over time to seek the circle. We have seen many other explanations for why it tends to do that, but we have never been told the central reason: charge. We have been told the circle is mathematically and kinetically the most efficient shape for an orbit, which is true, but the circle is also the most efficient as a matter of charge. All celestial bodies are charge engines, as I have proven. Therefore, if that engine wishes to maximize the amount of charge it can capture from a central body, it will move about that body in a shape that encloses the area of most emitted charge: the circle.

Just think if the Earth moved about the Sun in a square. Not only would it not be stable as a matter of forces for most of its orbit, but it would also have to subsist on a greatly reduced amount of charge per second. You may think the former consideration is the more important, since we have been taught orbits are determined by forces. But the latter consideration is actually the most fundamental. Balancing of forces can not be the primary consideration, since celestial bodies can exist out of balance for long periods of time. The ellipse is proof of that, as are the C-orbit asteroids. Bodies thrown out of balance can be thrown back in by competing forces. In other words, orbits are correctable, within certain boundaries. So orbits don't have to be (approaching) circular for that reason. No, they seek the circle to maximize the amount of charge they can feed on per second.

Besides, we have seen that all forces are caused at the ground level by charge. Charge determines everything. So any balancing of forces will ultimately devolve to a balancing of charge. This means that all orbital math, whether thought of as geometrical or dynamical, is ultimately an outcome of charge structures. So the demand that all matter must maximize its charge efficiency is what determines structure at all levels, from sub-nuclear to cosmic.

But back to our first question. Why not square the circle as a matter of circumference? Why talk of area? Given what I have discovered, I now think it was a matter of misdirection. If this question had been framed as a matter of circumference rather than area, someone might have figured out earlier what I did. Construction with real tools tends to push a person to a step method when comparing the circumference of a circle to a square, and that step method takes one to a manhattan metric or taxicab geometry, where pi=4. By that method, the equivalent square is easy to draw:



The square has a much larger area, but as a matter of kinematics it has the same circumference as the circle. Both circumferences are 8r. That is to say, if you treat the circumference as a distance that has to be traveled by a real body, the distances are equal. It will take the same time to travel the circle as the square.

No one ever thought to frame this question as one of kinematics or motion, however. It was framed as geometric only, which served to bury my discovery for millennia. And the fact that it was framed as geometric from the beginning messed up kinematics all along, because mathematicians and physicists never figured out that kinematics couldn't be expressed by classical geometry. They never understood that motion added a degree of freedom as well as a mathematical dimension. In other words, they didn't understand how a circle was actually **constructed**. Although in geometry the circle is given, in the real world a circle can't be given. It has to be constructed.

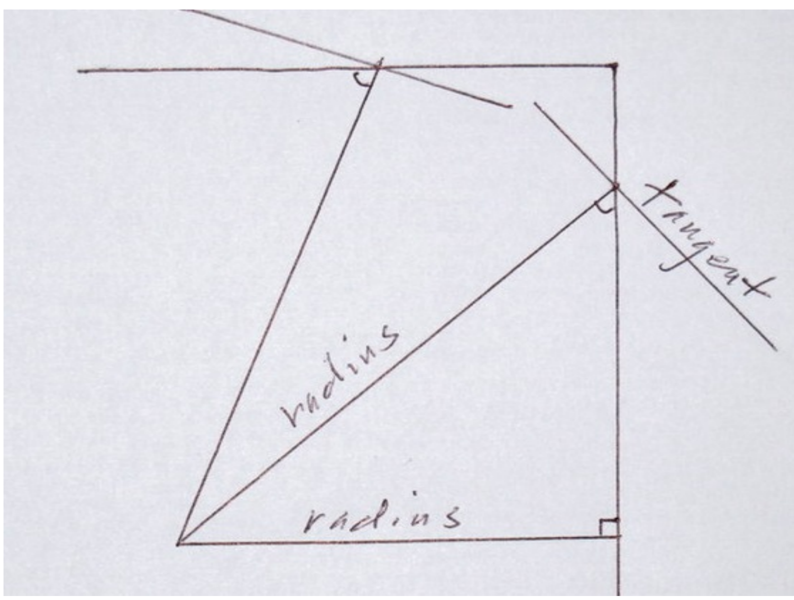
You will say that if that circle and square are actually equivalent regarding circumference, then it is the square that maximizes the area, not the circle. So the planets should orbit in squares to maximize charge intake.

Yes, it does get confusing, I admit. But the answer is that area is not kinematic, as I already admitted. Area really is static or geometric, since we don't care how long it takes a real body to surround that area or shape. Area is a function of content, not motion. So in that case we don't use the equivalency above, which is a kinematic equivalency. In the case of charge, we want to know how much charge is in that area, so even if we bring time into the problem, it doesn't make it kinematic. Say we want to know how much charge is in a given area in one second. Well, we don't track individual photons, do we? We don't care how fast they are going, except insofar as it tells us whether they are in or out during that period. So the above square and circle *aren't* equivalent in that sense.

To see that, we have to imagine we are one of the photons. Say all photons are released from the center of the area and travel out on a radial line, as if they are coming out from a central sun, for instance. They don't see the red square above as equivalent, since it has a much larger **average radius** than the circle. So they would see the equivalent square as the one that had the same average radius as the circle. That would be the first equivalency we studied above, of static perimeter. Given that equivalency, we then find the circle has the maximum area.

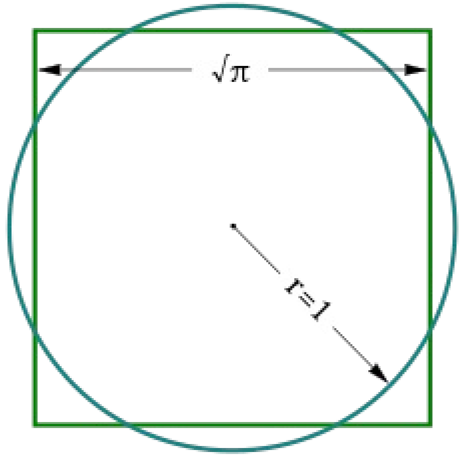
But why? Why does the circle have more area that the equivalent square? If the average radius of both figures is the same, why would one have more area than the other? Shouldn't the same average radius give us the same area? No, because area isn't a function of radius alone. That is why area doesn't follow circumference, as we saw in previous papers. Area is a function of shape, and shape can't be determined by average radius. You can create an infinite number of possible shapes with the same average radius, but they won't have the same areas. This is because shape is determined by average radius *and* the angle to radial line. The circle maximizes that summed angle, since each and every value in the sum is 90. With the square, only four values in the sum are 90, while all others are less. If we compare the square to the equivalent circle, we find the square loses area more often than it gains, due to those angles.

Also notice that when the angle to radius is maximized with the square, the *length* of the radius is minimized. So when the square is most like the circle, it has the least radius. So the angle being at maximum doesn't really help it.



In other words, you just have to think of the square as a type of circle, and try to measure it using a radius, instead of with external legs. The square then becomes a circle with a variable radius, right? Its radius has four maxima and four minima. You then compare it to the circle in that way.

The next step is to let the radius of the square intersect its own perimeter, then notice that an angle is created. While that angle is always 90 with the circle, with the square it is 90 only at four places—the midpoints of the legs. At all other points that angle is less than 90.



That square and circle have equal areas, and that is because the square loses the same as it gains, due to angles to radius. But that square and circle do *not* have equal perimeters. The circumference of the circle is 2pi=6.28, while the circumference of the square is 4√pi=7.09. The square needs a larger perimeter to create an equal area. If we make the square smaller to match the perimeters, those four external areas in the corner get smaller, while the four external areas of the circle get larger. So the angles gained by the square become smaller than the angles lost, and the summed angle to radius therefore becomes smaller with the square. **So all you need to know here is the radius and the angle to radius.** The problem can be solved with that and only that.

You will say that summing the angle of the square won't help us, because the angle is over 90 exactly as much as it is under 90, so as a sum it will even out to 90, just like the circle. But you see that you can't ever let it go over 90. *Any* angle that is not 90 will cause the square to lose area compared to the equivalent circle, because that angle causes a cut into the interior of the perimeter. You will say that angle also causes a gain on the other side of the radius, but that gain is *outside the tangent*, so it doesn't count toward area. That angle is part of *the next* differential. We are only following angles on the short side here. So in summing the angle, you don't measure from the same direction as you go around the clock. You measure from whatever direction will give you an angle under 90. I trust you followed that logic.

That is the simplest answer*, and it still requires some precise visualization, but I find it very much preferable to the answer you will find on the internet. For instance, I encourage you to study the top-listed answer on Google, which comes from stackexchange.com. There Mark Eichenlaub explains it with a 2D gas inside a rope. If you find that explanation useful, I don't know what to say. Even if you comprehend his explanation, it must be inferior because he is trying to explain geometry with pressure and tension gradients. That is upside-down. The more complex should be explained by the less complex, not the reverse. The simplest explanation only requires radius and angle, so bringing in pressure and tension gradients is unnecessary confusion. The second ranked answer there is by Agusti Roig, and he gums this up even more with Green's theorem and a lot of integrals most people won't understand. Why? Why can't he tell you it is just a matter of radius and angle?

If that wasn't confusing enough, you can go to Quora, which has the second-ranked set of answers at Google. There you will be shunted into the isoperimetric theorem, which again confounds the issue and doesn't even answer the question.

The answers at groups.google.com are likewise a mess. What about the answer at mathcentral? Again, Stephan La Rocque doesn't answer the question. He only *demonstrates* that the circle has the greatest area, but doesn't tell you precisely why. His answer boils down to: because the equations tell us it does.

What about mathforum? Dr. Anthony's answer is the same as La Rocque's. None of the other “Dr.'s” give you a comprehensible answer, either.

And so on down the line. I found no one that gave you my simple answer. Is it because they don't know, or is it because they aren't good at simplifying an explanation down to basics? Hard to tell, but given all my previous analysis of physics and math, we shouldn't assume they know. They didn't know that pi=4 when motion is involved, so why assume they know why the circle maximizes area? Again, I can tell you in once sentence: **the circle maximizes area because it maximizes at the same time both the radius and the summed angle to radius.**

*Some will ask why I don't write this out as integrals, and it is because I am trying to give you the stripped-down *mechanics* here, not the full math. If you want the full math, you can go to Roig above, or a thousand other places. As usual, what I am trying to give you is the ground-level **understanding** of what is going here. Most of my readers won't be interested in the full math, but even my readers who can comprehend the full math may appreciate a simple intuitive-level or constructive-level explanation.