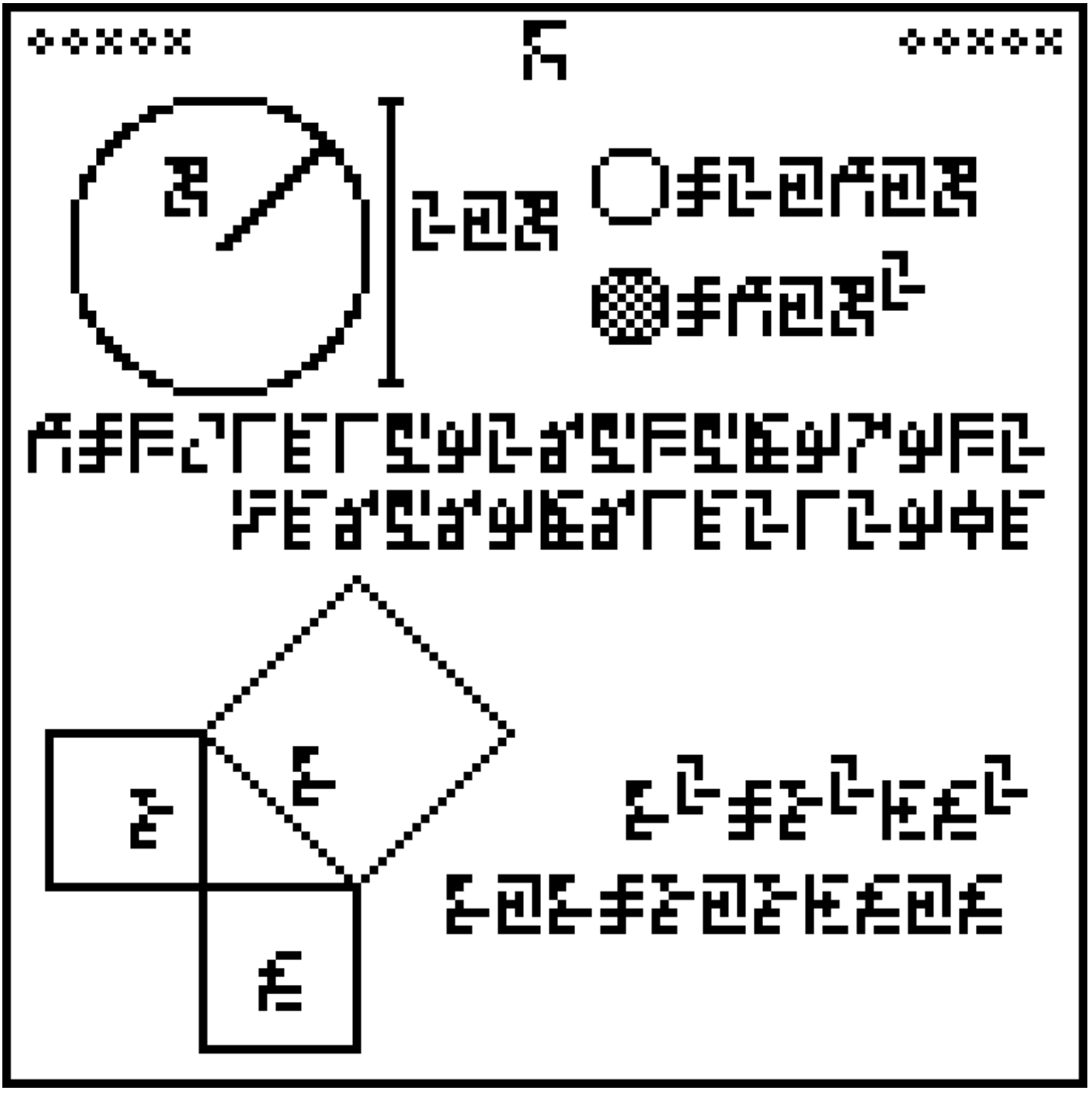
The Universe of Discourse

Wed, 19 Aug 2015

A message to the aliens, part 5/23 (geometry)

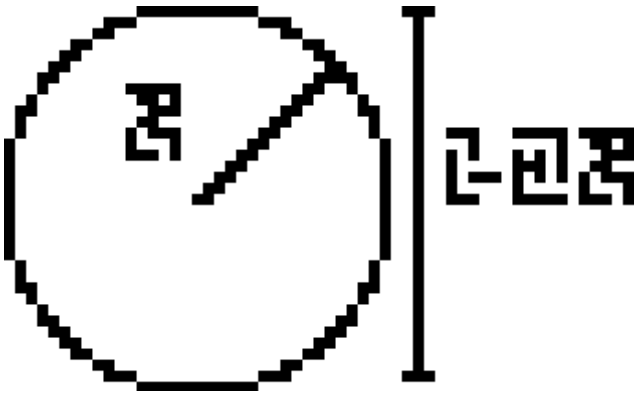
Earlier articles: Introduction Common features Page 1 (numerals) Page 2 (arithmetic) Page 3 (exponents) Page 4 (algebra)

This is page 5 of the *Cosmic Call* message. An explanation follows.

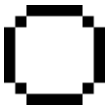


The 10 digits again:

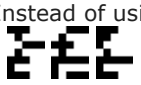
Page 5 discusses two basic notions of geometry. The top half concerns circles and introduces π. There is a large circle with its radius labeled  :



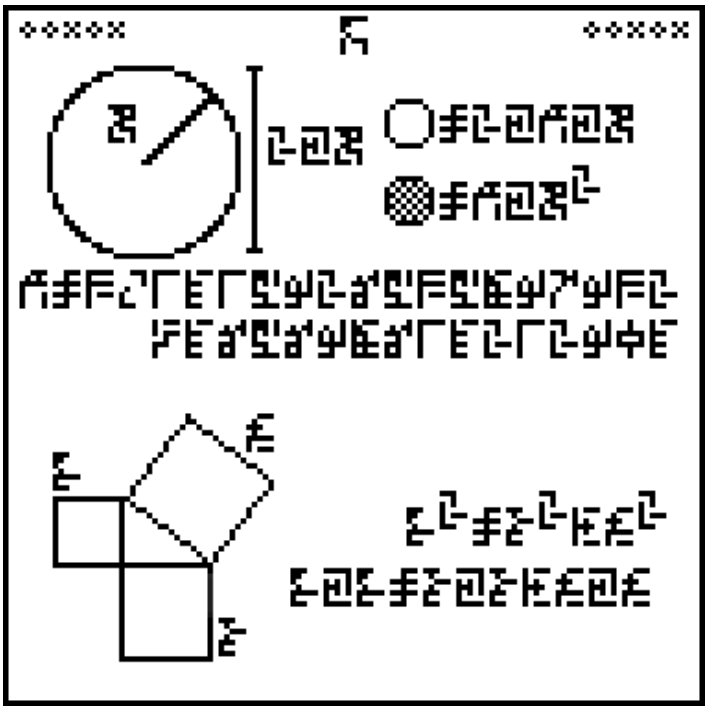
The outer diameter is then  which is $2 \cdot r$.

The perimeter  is twice  times the radius  , and the area  is  times the square of the radius  .

What is  ? It's π of course, as the next line explains, giving $\pi = 3.1415926545697932\ldots365698614212904$, which gives enough digits on the front to make clear what is being communicated. The trailing digits are around the 51 billionth places and communicate part of the state of our knowledge of π. I almost wish the authors had included a sequence of fifteen random digits at this point, just to keep the aliens wondering.

The bottom half of the page is about the pythagorean theorem. Here there's a rather strange feature. Instead of using the three variables from the previous page,  , the authors changed the second one and used  instead. This new  glyph does not appear anywhere else. A mistake, or did they do it on purpose?

In any case, the pythagorean formula is repeated twice, once with exponents and once without, as both $z^2 = x^2 + b^2$ and $z \cdot z = x \cdot x + b \cdot b$. I think they threw this in just in case the exponentiation on the previous pages wasn't sufficiently clear. I don't know why the authors chose to use an isosceles right triangle; why not a 3–4–5 or some other scalene triangle, for maximum generality? (What if the aliens think we think the pythagorean theorem applies only for isosceles triangles?) But perhaps they were worried about accurately representing any funny angles on their pixel grid. I wanted to see if it would fit, and it does. You have to make the diagram smaller, but I think it's still clear:



(I made it smaller than it needed to be and then didn't want to redo it.)

I hope this section will be sufficiently unmistakable that the aliens will see past the oddities.

The next article will discuss page 6, shown at right. (Click to enlarge.) Try to figure it out before then.

[Other articles in category /aliens/dd] permanent link