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I do show them a couple pages of fancy formulas for pi- Ploufe's, Euler, Newton, etc. -- even though they can't understand most of them. Leibniz's, they can--- pi = 4( 1 - 1/3+1/5- 1/7 +... . And then I show them how to code it in Python to get as many digits as they want.

But what I found today was how useful it is to point out that pi is NOT 3.14... if you measure a circle on a sphere . I showed them how the circle at the equator of a soccer ball would have a diameter on the surface much greater than a diameter on the circle cutting the middle.

I asked if pi would be bigger or smaller than 3.14, first. Smaller, Lyndon said, because the diameter in pi = C/D is bigger. So I asked if it would be bigger than 2, or less?

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. I drew a picture, as the first step in solving any problem, of a line with a semicircle above it. The line is the flat-circle diameter, which we call length 1, for convenience. The semicircle is the ball-circle diameter, the unknown we're trying to find.

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I had them eyeball it and write their estimates on lapboards. 1.1, 2, 2.5 3, 2.5. Reasonable guesses, but almost all too big. I asked how to find it more accurately. "Use string" was the good scientific answer. I said they could do much better mathematically with info they had.

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They were stumped. I said I'd give them a couple of minutes. I should have had them discuss it together too. Then Zoe suggested 3.14. "The right idea," I said, "but wrong." Eyeballing, 3 is too big.

They were still stumped. Then the light bulb went on. It's \*half\* a circle, not the whole circle. So what is it? Lyndon was first with his mental calculation--- 1.57. So it was less than 2 after all.

There were two things I didn't have time for. First, upper and lower bounds for the circle-on-a-ball pi by drawing a triangle inside the semicircle and a rectangle enclosing it. We'd need to use the Pythagorean Theorem for the triangle, I think, making it two right triangles.

Second, point out that pi-on-a-ball depends on which circle, unlike pi-on-a-flat-circle. If you have a small circle, pi gets bigger, approaching 3.14, because the diameter doesn't have as big a hump to go over (less curvature).

This was all inspired by a Tweet I read yesterday but didn't understand, something about how pi comes out differently when you use different metrics, all the way up to the taxicab metric, if I remember rightly.