

Equations, Code, and Salvador Dali for Pi Day...

MAR 14 9 1 ...

Pi, Part II

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Amelia Buzzard Writer's Blog(ck) Mar 14 Liked by Eric Rasmusen

I liked that you gave the 7th graders a sheet of mysteriously complicated looking formulas, instead of just including ones they would understand. It gives them a sense of how much further they could go with math if they wanted to. That sort of pedagogical move should have a name.

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Eric Rasmusen 2 mins ago Author

Yes, it really should have a name. Do you have a suggestion? You are good at making up words.

Formulas are fun, if you don't have to prove them. They're especially fun if you can program them, which maybe I'll have them do next year.

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Eric Rasmusen Mar 14 Author

I'll have to remember those till next February.

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Joe Horton Mar 14

Very cool, Eric. I don't know Python, but since you do, how about throwing in a bit of code that counts cycles? It would be interesting to know how fast the series reach arbitrary degrees of accuracy.

The $\pi = f(\text{shape of surface})$ reminds me of my introduction to non-Euclidean geometry. It was a charming little Dover book entitled "Taxicab geometry." Distances were measured n to by taking $\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$ but just by $(x_2-x_1) + (y_2-y_1)$ --in other words, the way a cab would drive in a city whose streets are laid out on an infinite square grid. The results are interesting, too. For example, what does a circle look like? An ellipse? A hyperbola? The answers weren't intuitive to me until I started calculating them. Then the patterns became obvious. And fun.

I don't recall whether I mentioned how (or that) π figures heavily into Sagan's love, Contact. But it does, and it's central to what, to me, was a central message in the book. Cannot recommend it highly

enough.

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Eric Rasmusen Mar 14 Author

Actually, I thought of the non-Euclidean angle because of a tweet somebody wrote that talked about the taxicab metric and Pi. I couldn't understand it, but it got me to thinking.

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Eric Rasmusen Mar 14 Author

Python is easy if you know Fortran or Pascal or Basic-- it is well written so you can guess at commands and be right. To see what happens each iteration, uncomment the print commands.

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Joe Horton Mar 14 Liked by Eric Rasmusen

In taxicab, $\pi = 2\sqrt{2}$

Proof left for the reader. Hint: draw a circle in taxicab. It's the same definition as everywhere else: set of points equidistant from the center. But the way you measure distance is what changes.

So Taxipi day is February 8th--just a day after e Day!

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Eric Rasmusen Mar 15 Author

Neat! It's interesting that this idea is really no more complicated than using the sphere, but I think it would be much harder for my 7th graders to understand why it's worth thinking about, and how a circle (equidistant points) could be a square.

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Joe Horton Mar 15 · *edited Mar 15*

Might actually be easier: Analogize it to walking from the southeast corner of a city block to the northwest corner. How far is it? Depends on how you measure it. Are you a crow (Cartesian) or a dog (Yellow Cab)?

That gets a basic intro into measurement theory, which need go no deeper in the 7th grade--except for the nerdy kid [note: singular] who's inherently curious. But everyone will know that there is such a thing.

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