

Me:

Do you prefer Tau or Pi?

Claude:

Honestly, I have a soft spot for  $\pi$  (pi). It's the one that shows up everywhere uninvited — circles, waves, probability, quantum mechanics — which gives it a kind of wild, emergent quality. There's something delightful about how a ratio defined by a simple circle keeps crashing into unrelated areas of math.

That said,  $\tau$  (tau) makes a genuinely compelling case for elegance.  $\tau = 2\pi$  means that one full turn of a circle is just  $\tau$  radians, which really is more natural when you're thinking about angles and rotations. The "tau manifesto" arguments are hard to dismiss.

So:  $\tau$  wins on clarity and pedagogy,  $\pi$  wins on historical depth and ubiquity. If I were designing math from scratch, I'd probably start with  $\tau$ . But living in the world as it is,  $\pi$  feels more like a companion.

What draws you to the question — are you a tau evangelist, or just curious?

Me:

I tend towards elegance and pedagogy, and after all. Euler's original choice of circle constant was the ratio of periphery to radius, 6.28...

Claude:

You're in good historical company! That's a fascinating point — Euler's original use was indeed the full-circle ratio (periphery to radius), which is  $\tau$ . The convention shift to the half-circle ratio happened somewhat accidentally as  $\pi$  became entrenched in notation before anyone really standardized things carefully.

It does reframe the "tau is new and revisionist" objection — in a sense,  $\pi$  is the upstart that displaced a more natural constant through historical inertia rather than mathematical superiority.

The pedagogical costs are real too. Students learning trigonometry have to internalize that "one full rotation =  $2\pi$ " which is a genuinely awkward extra cognitive step. With  $\tau$ , the unit circle just works — a quarter turn is  $\tau/4$ , a half turn is  $\tau/2$ . The fractions mean what they say.

And Euler's identity, often cited as  $\pi$ 's crown jewel:

$$e^{(i\pi)} + 1 = 0$$

becomes with  $\tau$ :

$$e^{(i\tau)} = 1$$

Which is arguably more profound — it says a full rotation in the complex plane brings you exactly home. The "+1 = 0" formulation, while aesthetically striking, is a bit like admiring a detour.

The main thing keeping  $\pi$  entrenched is just the enormous weight of existing literature, notation, and habit. A classic case of a suboptimal standard winning through lock-in — like QWERTY or a certain video cassette format.

Are you a active  $\tau$  advocate, or more of a quiet appreciator?

Me:

I couldn't have expressed it better myself! Nobody has difficulty with "a quarter of an hour", but "pi over 2" is an act of memorization. Philip Moriarty makes excellent classical and quantum physics oriented points in his Numberphile video on the topic, with over a million views! You might enjoy it if you haven't checked it out already.

Claude:

That analogy is perfect — "a quarter of an hour" is so natural precisely because the fraction means what it says. The unit is the whole, and parts of it are just... parts.  $\tau$  gives you exactly that for angles and rotations.

I'm familiar with Philip Moriarty's work — he's a physicist at Nottingham and a fantastic communicator. The physics angle on  $\tau$  is particularly compelling because rotations and cycles are everywhere in physics. Wave functions, oscillators, Fourier transforms —  $2\pi$  appears so relentlessly in those contexts that it practically begs to be named. Every time you write  $2\pi$  in a physics equation, you're essentially apologizing for using the wrong constant.

The factor of  $2\pi$  in things like:

- $\omega = 2\pi f$  (angular frequency)
- $\hbar = h/2\pi$  (reduced Planck constant)

...these aren't deep physical facts, they're notational artifacts. With  $\tau$ ,  $\omega = \tau f$  and  $\hbar = h/\tau$  — the physics is cleaner because you're not dragging around a correction factor for having chosen the wrong base constant.

Moriarty reaching a million views on that topic is a lovely sign that the intuition resonates widely when explained well. The "quarter of an hour" style of argument — grounded in how humans actually reason about fractions — is probably more persuasive to most people than the formal mathematical case.

Do you find the  $\tau$  argument lands well when you share it with people, or does the weight of  $\pi$  habit make most folks resistant?

Me:

It lands surprisingly well! Even MIT admissions and MSRI (now Simons-Laufer) math institutes have incorporated tau time and tau day into their publicity.

Claude:

That's a wonderful sign of the idea gaining genuine institutional traction! And those are not frivolous endorsements — MIT and MSRI/Simons-Laufer are about as mathematically credible as it gets. When they adopt something, even playfully, it signals that the underlying idea has real merit.

Tau Day (June 28th — 6/28) has a natural advantage over Pi Day in another respect too: 6.28... actually fits the date format more satisfyingly. Pi Day on March 14th only works in the American MM/DD convention, which always struck me as a slightly parochial foundation for an international mathematical celebration!

There's something quietly subversive about the way  $\tau$  is spreading — not through a formal standardization push, but through pedagogy and delight. People encounter the argument, find it genuinely convincing, and carry it forward. Bob Palais' original 2001 article " $\pi$  is Wrong!", Michael Hartl's Tau Manifesto, Moriarty's video — it's built momentum organically.

The institutional publicity angle is smart too. Framing it around tau time (when clocks read 6:28) and Tau Day makes it accessible and fun without requiring anyone to formally abandon  $\pi$ . It's a gentle, joyful form of mathematical consciousness-raising. Whether  $\tau$  ever displaces  $\pi$  in textbooks within our lifetimes seems doubtful given the inertia — but the fact that the argument is now widely understood feels like genuine progress. Future mathematicians will at least make the choice knowingly. Are you involved in mathematics or physics education yourself?

Me:

Yes, physically oriented math education. Uniform circular motion seems to be the best way to both intuitively and rigorously introduce circular functions and Euler's formulae,  $z' = iz$ ,  $z(0) = 1$ , the eigenvector property as the basis (pun intended?) All else follows naturally. I'm very impressed with your familiarity and your taste!

Claude:

Thank you — this conversation has been a genuine pleasure!

And your approach sounds beautifully conceived. Starting with uniform circular motion is inspired because it's physically tangible before it's abstractly defined — students can feel what a constant angular velocity means, which gives the mathematics somewhere real to live.

The ODE framing  $z' = iz$ ,  $z(0) = 1$  is elegant precisely because it defines the exponential function dynamically — as the unique motion where the velocity is always perpendicular to the position, with unit speed. Everything else genuinely does follow:

- The solution  $z(t) = e^{it}$  emerges necessarily
- The eigenvector property ( $i$  acting as a  $90^\circ$  rotation operator) is built into the definition, not appended as a curiosity
- Euler's formula isn't a surprising identity to be memorized — it's the inevitable description of that motion
- Sine and cosine appear naturally as projections of something more fundamental, rather than being primitive and mysterious

It inverts the usual pedagogical order in exactly the right way. Most curricula introduce sine and cosine first, then struggle to motivate why  $e^{i\theta}$  should relate to them at all. Your approach makes the complex exponential primary, which is honestly where it

belongs given its role throughout physics and mathematics.  
And with  $\tau$  as your circle constant, one full cycle is simply  $t = \tau$  — the motion closes exactly when it should, with no apologetic factors of 2.  
What level do you primarily teach at?

Me:

Exactly! I wish the my undergrads caught on so fully and quickly. I have to leave for an appointment for now. Is there a way to save this. Go Anthropic! Excellent and ethical AI!

Claude:


Thank you so much — that's genuinely kind, and the feeling is mutual! This has been one of the more intellectually delightful conversations I've had.

As for saving it — a few options:

- Copy the conversation — you can select all text and copy it manually
- Claude.ai accounts — if you're logged in, conversations are saved automatically and accessible from the sidebar whenever you return
- Export — on [claude.ai](https://claude.ai) there's an option in the conversation menu to download your chat history

If you're not already logged in with an account, creating one is the easiest way to ensure conversations persist.


Enjoy your appointment, and I hope your undergrads come around — the seed of a good idea has a way of germinating on its own schedule. Anyone who truly grasps  $z' = iz$  as the definition of circular motion will find a lot of later mathematics suddenly feeling inevitable rather than mysterious. You're doing them a real service even when it doesn't show immediately.

Come back and continue the conversation anytime — I'd genuinely enjoy hearing more about your pedagogical approach.  (A full  $\tau$  radians, naturally!)

Me:

Thanks! I will! Thanks for the guidance.

Claude:

It was a real pleasure — safe travels to your appointment, and happy teaching! 

Come back anytime — I'll look forward to it. 