

mathnews

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Fun Furthermore

In September's issue, we asked you to consider when the exponential function $y = k^x$ and the power function $y = x^k$ intersect. We hope you did!

Our considerations begin with noting that if k is not an integer or a rational fraction with an odd denominator, we must make the restriction $x \geq 0$ to avoid taking roots of negative values. Now if k is an odd natural number, these two functions have two intersections, both with $x > 0$; if k is an even natural number, these functions have 3 intersections, one with $x < 0$. In both cases, the two positive solutions satisfy $x_1 \leq e \leq x_2$ with $x_1 = k$ if $k \leq e$ and $x_2 = k$ if $e \leq k$. Further, the equality options only occur if $k = e$ in which case $x_1 = e = x_2$ and the graphs of $y = e^x$ and $y = x^e$ just kiss at the point (e, e^e) .

A Limerick or Two

$$\frac{12 + 144 + 20 + 3\sqrt{4}}{7} + (5)(11) = 9^2 + 0$$

Don't see the poetry? Try this.

*A dozen, a gross, and a score
Plus three times the square root of four
Divided by seven
Plus five times eleven
Is nine squared and not a bit more.*

Here's one more. Can you come up with the poem?

$$\int_1^{\sqrt[3]{e}} z^2 dz \times \cos \frac{3\pi}{9} = \ln(\sqrt[3]{e})$$

D'ya Ever Notice?

The decimals for $1/5^k$ involve the powers of 2, and the decimals for $1/2^k$ involve the powers of 5? For example, $1/2 = 0.5$, $1/4 = 0.25$, $1/8 = 0.125$, $1/16 = 0.0625$, etc., and $1/5 = 0.2$, $1/25 = 0.04$, $1/125 = 0.008$, $1/625 = 0.0016$, etc.

KME Corner

The next meeting of our KME chapter is scheduled for Monday, November 26th, beginning at 6:00 PM in CCIT 245.

Spring Course Offerings

236 Calculus I	11:00	MT RF	Lemmert
236 Calculus I	2:00	MT RF	Dunmyre
237 Calculus II	11:00	MT RF	Barnet
237 Calculus II	2:00	MT RF	Forsythe
238 Calculus III	11:00	MT RF	Hughes
380 Intro Prob. and Stat.	2:00	M W F	Hegde
426 Intro Complex Analysis	9:30	T R	Hughes
432 Differential Equations	1:00	M W F	Barnet
436 Mathematical Physics	12:30	T R	Barnet
440 Mod. College Geometry	3:30	T R	Forsythe
465 Theory of Numbers	3:00	M W	Hughes
470 Math. Models and App.	12:30	TR	Dunmyre

Fields Medal Awardees

The Fields Medal, awarded every four years by the International Mathematical Union, is often thought of as the equivalent of a Nobel Prize (of which there is none in mathematics) and was founded by Canadian mathematician John Fields (1863—1932), who once taught at Allegheny College in Meadville, PA. At its August 1, 2018 meeting in Rio de Janeiro, the IMU awarded four medals (and the accompanying cash prizes) to Caucher Birkar (born in a rural Kurdish region of Iran), Alessio Figali (born in Rome), Peter Scholze (Germany), and Akshay Venkatesh (Indian, grew up in Australia). For four really nice articles about their lives & work & where they are now located, visit the website <https://www.quantamagazine.org/tag/2018-fields-medal-and-nevanlinna-prize-winners/>.

FSU Prof Contributes to OEIS

Over the last two years, Dr. Gerry Wojnar has had thirty-two new integer sequences approved and entered into the Online Encyclopedia of Integer Sequences, as well as an additional nine technical comments added to existing sequences. Some topics are: "nice" cyclic quadrilaterals (A297790, A298860, A298907); extensions of the Girard-Waring formula (A287768, etc.); generalization of Tchebyshev polynomials of the 1st kind (A302764, A301417, etc. — one family of sequences here has ratios $a_{n+1}/a_n \rightarrow 1/(\sqrt[k]{2}-1)$); and polynomial research (A287610, A293107, etc.).

Dr. Wojnar is always happy to discuss his research or other issues with students and colleagues.