

# math news

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## Time Will Tell

How many times in one day will the minute and hour hands of a 12-hour clock overlap? If we start at 12:00 am (midnight), that's 1. Next will be a little bit after 1:05, then 2:10+, 3:15+, 4:20+,, etc. Note that each "little bit after" increases each hour. Note also that the "little bit after" 11:55 is all the way at 12:00 pm (noon). Counting carefully, see that there are 11 such times not including 12:00 pm (noon), and that will be the same for the second twelve-hour period that day. Hence our answer is 22.

An argument could be made for 23, if you could argue that 12:00 am (midnight) is part of BOTH days. That raises the issues of time's ultimately being a continuous variable while most clocks (even analog ones) are constructed to run in a discrete manner.

As for a twenty-four-hour clock, similar counting yields 23 occasions of overlap. It's 24 if you count 24:00 (or is it 0:00?) twice.

## An Exercise Re Exercise

Kenny, Abby, and Ned got together for a round-robin pickleball tournament, where, as usual, the winner stays on after each game to play the person who sat out that game. At the end of their pickleball afternoon, Abby is exhausted, having played the last seven straight games. Kenny, who is less winded, tallies up the games played: Kenny played 8 games; Abby played 12 games; Ned played 14 games. Who won the fourth game against whom? (Submit solutions to any MATH instructor.)

## Spring 2022 Course Offerings

236.001 Dr. Kelly Bulp M/TU/TH/F 11:00am-11:50am  
236.002 Dr. Kelly Bulp M/TU/TH/F 2:00pm-2:50pm  
237.001 Dr. Katherine Horacek M/TU/TH/F 11:00am-11:50am  
237.002 Dr. Katherine Horacek M/TU/TH/F 2:00pm-2:50pm  
238.001 Dr. Mark Hughes M/TU/TH/F 11:00am-11:50am  
350.001 Dr. Katherine Horacek M/W/F 9:00am-9:50am  
380.001 Dr. Laxman Hegde TU/TH 9:30am-10:45am  
380.002 Dr. Laxman Hegde TU/TH 11:00am-12:15pm  
432.001 Dr. Frank Barnett M/W/F 2:00pm-2:50pm  
440.001 Dr. Robert Forsythe M/W 3:00pm-4:15pm  
461.001 Dr. Mark Hughes TU/TH 3:30pm-4:45pm  
470.001 Dr. Frank Barnett TU/TH 5:00pm-6:15pm

## KME Corner

Our local chapter of KME will meet Tuesday, September 28<sup>th</sup> from 6:00 to 7:00 in room 223, including puzzles and pizza. Drs. Hughes and Barnett continue as advisors.

## Another New Face Joins Department

FSU MATH welcomes Brittany Raley as our new Administrative Assistant. No stranger to FSU or to the city, she's also joined Social Work, having served as Police Communications Operator and in the Financial Aid Office previously. When asked what brought her to these new departments, Brittany had a simple answer: the desire to work more with students.

When she isn't on campus, Brittany loves to be outdoors. She rides UTVs in her spare time, likes to walk on campus, and even enjoys bringing some nature indoors to her workspace, such as the 17-year-old peace lily you can see at her desk, should you stop by to help welcome her. And the other required fun fact: her favorite movie of all time is *A Bronx Tale*.

## Epidemic Modeling: Older Than You Might Think

Most "math types" have heard of the Bernoullis, including Daniel, whose passion for mathematics aided his study of medicine. Significantly, he produced a paper called *Exposition of a New Theory on the Measurement of Risk*, with implications for economics, ecology, and biology as well. In the mid-18<sup>th</sup> century, he made the case for universal inoculation against smallpox by mathematically evaluating the risk and reward of such a plan. Doctors had been inoculating healthy people via a process known as *variolation*, in which a small amount of a less-deadly strain of smallpox was introduced to a healthy person to induce immunity. The process involved many variables and unknowns within an individual's personal biology, so it is not surprising that some patients suffered a case of smallpox more severe than intended, and some even died. This uncertainty caused a great debate to ensue regarding the safety and efficacy of inoculation to individuals and to society. Bernoulli produced in 1760 what is believed to be the first compartmental model to analyze the risk and reward of inoculation using differential equations. A compartmental model is a classic epidemiological model in which members of a population are placed in compartments according to their status with regard to the disease studied. The work established a quantifiable assessment in favor of inoculation by showing that the life expectancy of a population subject to smallpox rose under universal variolation from 26 years, 7 months to 29 years, 9 months. It was a powerful argument in favor of inoculation.

Typically, with the development of the SARS-Covid vaccines, Bernoulli's model is once again seeing the limelight.