Vol. XXIX, No. 2 November, 2015

KME Corner

Kappa Mu Epsilon, national mathematics honor society, will meet on Wednesday, December 2nd at 7:00 pm in CCIT 245. The agenda is to include a presentation by Dr. Frank Barnet entitled "The Great American Solar Eclipse of 2017".

Old Riddles

Answers to last month's suggested riddles can be found on the website http://goodriddlesnow.com.

New Problem

What's the largest even integer that cannot be written as the sum of two odd composite positive integers?

Course Offerings for Spring 2016

236.001	MTRF	11:00-11:50	CCIT 223	Dunmyre
236.002	W TR	3:00-3:50 3:30-4:45	CCIT 264	Lemmert
237.001	MTRF	11:00-11:50	CCIT 221	Barnet
237.002	MTRF	2:00-2:50	CCIT 221	Barnet
238.001	MTRF	2:00-2:50	CCIT 264	Hughes
*340.101	T	6:00pm-8:30pm	CCIT 245	Michael
380.001	MWF	12:00-12:50	CCIT 264	Forsythe
380.002	MWF	1:00-1:50	CCIT 264	Forsythe
425.001	TR	12:30-1:45	CCIT 245	Hughes
432.001	MWF	10:00-10:50	CCIT 221 & 222	Barnet
436.001	TR	9:30-10:45	CH 234	Latta
437.001	TR	11:00-12:15	CCIT 264	Lemmert
470.001	TR	3:30-4:45	CCIT 221	Dunmyre
480.001	MWF	12:00-12:50	CCIT 222	Hegde

*Note that MATH 340 does not count toward a MATH major.

Inquiry-Based Learning in MATH 432

By *Dr. Justin Dunmyre*

Inquiry Based Learning (IBL) is a teaching methodology designed to promote active learning. This semester, I have been using this style in Differential Equations. It's best to illustrate IBL through example. Recently, we covered the Lotka-Volterra equations for modelling predator-prey interactions (in this case, rabbits and foxes).

$$dR/dt = 3R - 1.4FR \qquad dF/dt = -F + 0.8FR$$

In a traditional classroom, I would introduce the equations, and explain each term, 3R, -1.4FR, -F and 0.8FR. Next, I would present the boundary cases: how does the model behave if F=0 or R=0? Next, I would seek out equilibrium points. Finally, I would build up the phase plane by studying oscillations of the system.

In the IBL classroom, the path we take is guided but very flexible. The goal is for the students to have ownership of the mathematical arguments that we make. Given the same differential equations above, the students were given the following questions: Do any of the populations have unlimited resources? What does each term of the model mean? Instead of asking these questions in a question-answer lecture format, the students spend time discussing these questions. Meanwhile, I circulate around the room doing my best to listen to all of the mathematical conversations going on. My job is no longer to deliver the content to the students, instead my goal is to curate the discussion so that the students discover the content for themselves. In this case, in attempting to describe what the 3R term means, one student proposed that we should study what happens to the system if F=0. This led them to also studying what happens if R=0. From there, the students started to build up the oscillatory nature of the system, but were concerned (from seemingly unrelated previous topics) about critical equilibrium points, so we had a discussion on those. By the end of the entire discussion, students had made phase plane arguments, discovered and analyzed the boundary cases, and figured out what each term in the differential equation meant. We always have to keep our eye on the clock though, when we get wrapped up in the discussion, class is over before we know it!

So the two classes will have covered the same material, but the IBL class takes a bit longer to get there, and it gets there in an unpredictable way. Students are doing the mathematics the way I do it in my research — they make conjectures and discuss them. I help them by nudging them away from the dead ends, and toward the good leads. Ultimately, students are discovering the mathematics for themselves and are building a deep intuition for the material.

Math News is published for students, faculty, staff, and administrators by the Department of Mathematics.