The Square Route

A Mathematical Journey **October 2011**

BOARD OF EDUCATION BURNABY SCHOOL DISTRICT 41

Learning Communities

There are several exciting opportunities for teachers to be involved in their own professional development. This year, we are offering Elementary Learning Teams (grades 3-7) and Secondary Learning Teams (School-based) opportunities. The theme is engagement and will connect with the November 21st District Professional Development Day.

For the Elementary Learning Teams: Using the lens of engagement, learning team members will focus an inquiry around the frames:
Here's what I noticed…
Here's what I tried…
Here's what I learned

Learning teams will be given the opportunity to work directly with Karen Hume (Tuned Out – Engaging the 21st Century Learner) and Faye Brownlie (It's All About Thinking: Collaborating to Support All Learners).

Secondary school based learning teams will provide an opportunity for teachers to engage in an inquiry around student engagement. Teams (6 - 8 members) may be cross curricular or subject based. Each learning team member will receive Karen Hume's professional resource "Tuned Out, Engaging the 21st Century Learner". The learning teams will meet five times throughout the year.

To sign up, go to the Staff Development Calendar (see link below)

STAFF DEVELOPMENT CALENDAR Info & Registration

Kaprekar numbers

Consider an n-digit number k. Square it and add the right n digits to the left n or n-1 digits. If the resultant sum is k, then k is called a Kaprekar number. For example, 9 is a Kaprekar number since:

$9^2 = 81$; $8 + 1 = 9$

and 297 is a Kaprekar number since

$297^2 = 88209$ $88 + 209 = 297$

The first few are 1, 9, 45, 55, 99, 297, 703, …Can you find others?

The Value of Tardiness

One day in 1939, Berkeley doctoral candidate George Dantzig arrived late for a statistics class taught by Jerzy Neyman. He copied down the two problems on the blackboard and turned them in a few days later, apologizing for the delay — he'd found them unusually difficult. Distracted, Neyman told him to leave his homework on the desk.

On a Sunday morning six weeks later, Neyman banged on Dantzig's door. The problems that Dantzig had assumed were homework were actually unproved statistical theorems that Neyman had been discussing with the class — and Dantzig had proved both of them. Both were eventually published, with Dantzig as coauthor.

Contact

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Or go to the Math Blog:
http://blogs.sd41.bc.ca/math

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Tuning In: Engaging All Learners

Join us for a day of collaboration and exploration around engagement strategies. Choose to work with either Faye Brownlie or Karen Hume.

Space is limited! Pre-register on the staff development calendar. (www.sd41.bc.ca/staffdevelopmentcalendar)

Designed for Elementary and Secondary Teachers by Burnaby Teachers. Karen and Faye will facilitate conversations, collaborations and make connections around student engagement

Blogs and Twitter

Are you on Twitter? Do you use a blog in your classroom? Let me know and I can send out the informational links so others can share you knowledge. Or follow me @brynmw. Also, share your tweets with the district through the hashtag: #sd41

Let me know at brynm.williams@sd41.bc.ca

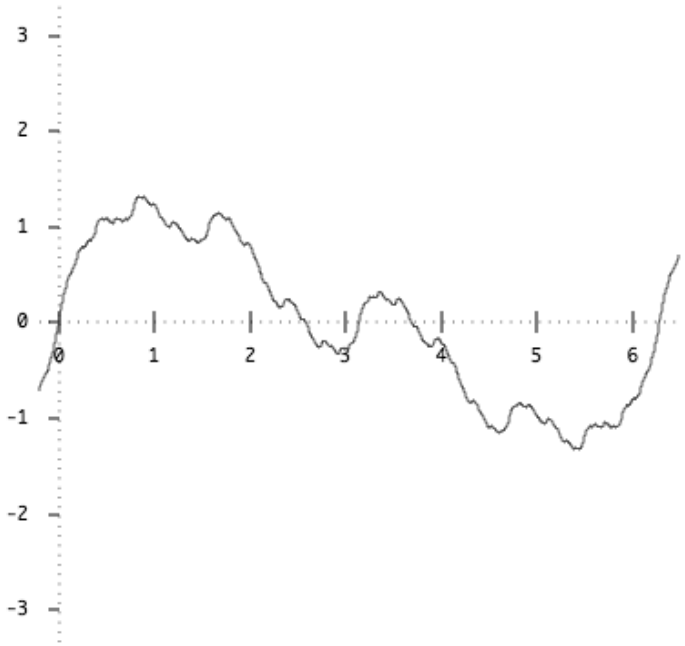
Weierstrass functions

Weierstrass functions are famous for being continuous everywhere, but differentiable "nowhere". Here is an example of one:

$$\omega(x) = \sum_{n=0}^{\infty} \frac{1}{2^n} \sin(2^n x) = \sin x + \frac{1}{2} \sin 2x + \frac{1}{4} \sin 4x + \ldots$$

It is not hard to show that this series converges for all *x*. In fact, it is *absolutely convergent*. It is also an example of a fourier series, a very important and fun type of series. It can be shown that the function is continuous everywhere, yet is differentiable at no values of *x*.

Here's a graph of the function. It is periodic with period 2π.



You can see it's pretty bumpy. So bumpy, in fact, that it's not differentiable anywhere. Even if you zoom in at one point, the graph retains the 'bumpy' look.

This is great example for AP Calculus students to see the difference between continuous and differentiable.