

Sinclair Mathnet

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FROM THE CHAIR



Hello and welcome to another edition of *Mathnet*. In the October 2007 issue, I indicated that an update on student performance in the revised MAT 191 pilot sequence would be given. Let's examine some data. On Test 1, the exam average for all sections of

MAT 191 was 79.48% and the median was 83.15%. On Test 2, the exam average for all sections was 70.04% and the median was 72.00%. Finally, on Test 3 the exam average for all sections was 74.01% and the median was 74.67%. Not only is it important to know how the students are performing on exams, it is also

important to understand how they view the changes which have been incorporated into the revised pilot. To this end, a survey was created and administered to all students currently enrolled in MAT 191 this quarter - about 120 students. From the results of the survey, it seems pretty clear that students are satisfied with the pacing of MAT 191. In response to the statement, "The homework in MyMathLab (an online supplement) contributes to my understanding of the material," the average response made by students was 3.94 on a 5 scale, with 5 being "Strongly Agree" and 1 being "Strongly Disagree." This might lead one to believe that students seem to really benefit from incorporating MyMathLab into the pilot sections. However, please see the table below which highlights some of the written comments that were collected through the survey; the number in parentheses indicates the frequency of the response.

What has contributed the most to your learning in this course?	What has contributed the least to your learning in this course?
<ul style="list-style-type: none"> • MyMathLab (28) • In-class lecture (25) • Instructor (19) • MyMathLab homework (13) • Pace of the course (7) • Group work (7) • Textbook homework (4) • Practice problems (4) • Homework (4) • One-on-one help from instructor (3) 	<ul style="list-style-type: none"> • Time management logs (24) • MyMathLab (19) • MyMathLab quizzes (13) • Textbook homework (9) • Group work (7) • Nothing (6) • Time limit on MyMathLab quizzes (4) • Too much homework (3) • Not being able to take the quizzes if I don't pass the homework (3)

What Have We Learned?

As you can see from the table, students are divided as to which aspect of the course contributed most to their learning. Students clearly recognize the value of having instructor-led discussions in the classroom. But the feedback concerning the group work that has been incorporated into the pilot sections surprises me since there has been a lot of research which suggests that students really benefit when group activities are incorporated into math classes.

Since this was a major component of the revision, I think the department needs to better understand why students rated the group activities in such a dichotomous manner. Finally, students have serious doubts about the benefits they received from the time management logs, although they were somewhat popular at the beginning of the quarter. This could be due to the fact that the time management logs served to verify what the students already suspected; *(Continued on Page 4)*



Faculty Feature

We welcome three new faculty members to the Mathematics Department this year, all hired as annually contracted faculty. Najat Baji, Lynn Schutte, and Tom Whitehead were hired to teach our Elementary and Intermediate Algebra courses, Math 101 and 102, and also the newer Math 191, 192, and 193 sequence.

Najat Baji is new to Sinclair, and indeed new to Ohio having moved here this past summer from New York. Najat seems to be enjoying Ohio, and says, "This summer, my husband and I were married, which brought me to the Dayton area. The atmosphere here in the Midwest is so peaceful and quiet compared to the busy hustle and bustle of New York City. I have now experienced the colorful wonders of fall in full glory, and the nature here is breathtaking." Her husband is employed as an aerospace engineer at Wright-Patterson Air Force Base, and they presently reside in Middletown, Ohio.



Najat grew up in Morocco where some of her family still live, and has traveled extensively. She holds a degree in Computer Science, and a Master of Arts in Applied Mathematics from the City University of New York. She has also studied Pre-Engineering in France, and took courses in Architecture in the Ukraine. When asked what brought her to Sinclair, she says she met Pauline Johns, a counselor here at Sinclair, through friends of her husband. Pauline spoke highly of the students and faculty at Sinclair, and referred Najat to the college website. In her spare time, Najat enjoys reading, painting, and carpentry projects with her husband.

Tom Whitehead has been teaching Mathematics since 1967, and has been teaching part-time for the Mathematics Department since 1979. He has taught at

many schools in the area, and has been a highly valued math tutor for Student Support Services since 2003. Tom has also taught for the Developmental Mathematics Department (now called Academic Foundations). He brings experience from the manufacturing industry as well, where he was a quality manager at a die casting company for about 11 years. Tom holds a Bachelor of Science Degree in Mathematics from Manchester College, and a Master of Education degree from Wright State University.

Tom keeps very busy with his family, including his wife of 41 years who teaches 2nd grade at Dayton Christian School. Both of his children have attended Sinclair College. His daughter earned an RN degree from Sinclair in 1991, and now lives in Florida with her family. Tom's son Dan took some electives here, and is currently working for a law office in Columbus, Ohio. Tom is the proud grandfather of four grand-daughters and a grandson. In his spare time, Tom sings with the church choir, and enjoys bicycle riding on local trails and at vacation spots with his family.



Lynn Schutte has been teaching part-time for the department for some time, and was recently recognized as the Part-Time Faculty Member of the Year Award for the Mathematics Department. You may recall the earlier *Mathnet* article written about her during the spring of this year. She brings much experience, including a career of teaching mathematics at the high school level. It was piano lessons, however, that brought her to Sinclair, and she continues to study and play the piano in her free time.



Please join us in welcoming the three newest members of the Mathematics Department!

Susan Harris ■



MATHEMATICAL INDUCTION

Like all powerful things, the method of proof by induction can be used or abused. Here is an abuse of the method. See if you can find the flaw.

Theorem: If any bag contains n objects, for $n \in \mathbb{N}$, then all of the objects will be identical.

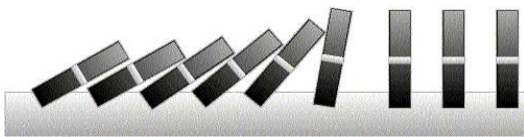
Proof: Let $P(n)$ be the statement, "If a bag contains n objects then they are all identical."

- 1) It is trivial that $P(1)$ is true.
- 2) Assume that $P(k)$ is true.

Now suppose we have any bag containing $k+1$ objects. If we remove one object, the bag contains k objects which, by the induction hypothesis, are all identical. If we now remove one of these identical objects and replace the object first removed, there are again k objects in the bag, which, by the induction hypothesis, are all identical. We now return the last removed object to the bag. It was identical before and therefore is still identical so all the objects in the bag containing the $k+1$ objects are identical. Therefore $P(k+1)$ is true. Hence $P(k)$ implies $P(k+1)$.

By induction, we conclude that $P(n)$ is true for all n .

Al Giambrone ■



The flaw: The argument in the second part of an induction proof must be valid for $k \geq 1$. The argument given only works for $k \geq 2$.

The Quadratic Trinomials

$$ax^2 + bx + c \text{ and } cx^2 + bx + a \quad (a \neq c)$$

Consider the trinomials

$$10x^2 + 17x + 3 = (5x + 1)(2x + 3)$$

and

$$3x^2 + 17x + 10 = (1x + 5)(3x + 2)$$

In general, if $ax^2 + bx + c = (ex + f)(gx + h)$, then $cx^2 + bx + a = (fx + e)(hx + g)$, since for both trinomials $a = eg$, $c = fh$, and $b = eh + fg$. Such related pairs of quadratic trinomials might make good practice problems for beginning and intermediate algebra students. Let students discover the patterns.

One might also ask: When do $ax^2 + bx + c$ and $cx^2 + bx + a$ ($a \neq c$) share a common binomial factor? If there is a common binomial factor, what is it?

There are 3 cases to consider:

- (1) $ex + f = fx + e$ when $e = f$, so that the common binomial factor is $e(x + 1)$ or $x + 1$.
- (2) $gx + h = hx + g$ when $g = h$, and again, $x + 1$ is the common binomial factor.
- (3) If $ex + f = hx + g$, then $e = h$ and $f = g$. But since $a = eg$ and $c = fh$, we have $a = c$. Similarly, if $fx + e = gx + h$, then $a = c$, contrary to the hypothesis that $a \neq c$; i.e., the polynomials are distinct.

Therefore the two trinomials either have distinct binomial factors or share a common binomial factor of $x + 1$.

Harvey Chew ■

Correction to last issue's part-time anniversaries: Vince Miller knows that time flies while teaching, but requests that he be credited with his full 25 years of part-time experience at Sinclair.



(Continued from page 1) they lead very busy lives, have precious little time to devote to their classes, and they can't do much to change the first two items. Once students received this "confirmation," they probably felt that the time management logs were a "waste of time," no pun intended. I do think that more work can be done to help students appreciate the value of the time management logs. To illustrate my point, take a stroll around the loggia (that's the walkway that overlooks the Starbucks in the library) between 10 am and 2 pm. What do you see? Students sipping Starbucks while doing their homework? Well I'm sure there are students doing just that. But there are also students checking out their MySpace page, listening to streaming music, and chatting online. The time management log examined the time students spent studying, it did NOT look at the amount of time students spent "surfing" the internet, watching TV, working (either at home or outside the home) or just "hanging out." As most of us know, to be successful in college requires sacrifice. Since our students cannot sacrifice the time they spend at their secular jobs or the time they spend taking care of their families, the only way we can encourage our students to devote more time to studying is by helping them to appreciate that studying needs to come before "recreation" no matter what form of "recreation" they prefer. Obviously, many of our students do make good use of their time, but I'm sure there are many students who could benefit from a thorough analysis of how they spend their time.

Another important area to discuss is the performance of our MAT 191 students on Test 1, Test 2 and Test 3. A median on Test 1 of 83.15% is certainly nothing to be ashamed of, and a median score of 72% on Test 2 and 74.67% on Test 3 is respectable. However, 23% of the students who took Test 1 were not successful, an alarming 48% of the students who took Test 2 were not successful, and 37.8% of the students taking Test 3 were not successful. Clearly, an organized and systematic approach must be taken to address this trend of nonsuccess. To that end, the MAT 191 pilot instructors will be involved in the creation of an action plan which will include a specific set of "treatments" (such as "early alerts" or mandatory attendance in a retention program) designed to improve the success of students taking mathematics courses.

What Lies Ahead?

The department and, in particular, the MAT 191 pilot instructors are to be commended for the time and hard work that has been invested in this project. The College too is to be commended for redirecting resources to support the work the pilot instructors have been doing. A lot of changes to the way MAT 191 has been taught in the past have been incorporated in a very brief amount of time. Some of these changes have never been tried before in this department, such as common chapter exams, common assessment "rubrics," and common "teaching" approaches. Further-more, some of the changes which have been incorporated in the pilot sequence have placed faculty at "odds" with each other, at least from a philosophical standpoint. (Fortunately no one was hurt!) However, I am gratified by the way the instructors have continued to work to improve the pilot, and, more importantly, have consistently given their best throughout this process! But, what lies ahead? The pilot instructors will continue to refine MAT 191, and in fact many of the features of MAT 191 will be expanded to MAT 192 next winter - specifically, more group work, common exams, MyMathLab, and a retention component. Additionally, I think the department will have to do more to encourage our students to more effectively use their time outside of the classroom and we will have to do more to encourage our students to "partner" with us. Finally, from a broader perspective, the Math Department needs a better understanding of the skill set our students bring to Sinclair if we are going to help them to succeed in math. So we might ask ourselves, "What topics do students study in a high school algebra class?" Hopefully I will have an answer to that question next year!

Tony Ponder ■

Harvey's Joke Corner

A question NOT to be found on a department final exam: Who said, "It's been real"?

- a) i
- b) i^2
- c) i^3
- d) i^4

e) Some two of the above.

