

# Math 8001: Teaching with Technology

October 25, 2012

Any current issues in your own teaching?

# Outline

Among *many* possibilities, we'll focus on:

- Webpages - Personal or Course Management System (Moodle)
- Computer Demonstrations in Class
- Webwork (online homework system)

# Webpages

In today's world we no longer default to handing out course announcements and other materials in person, on paper.

An aside: a webpage is an important part of your professional identity. Create one, make it informative, and keep it current!

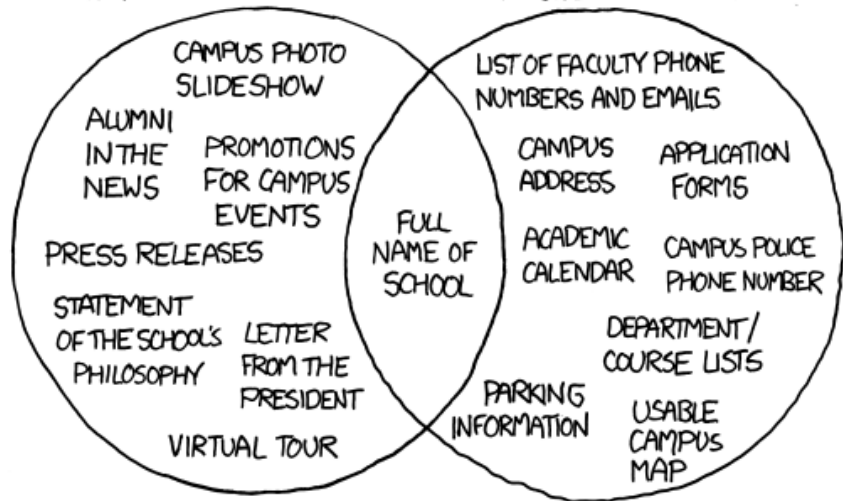
# Webpages

*A webpage does not need to be complicated, colorful or flashy to impart information effectively.*

–Paul Garrett

THINGS ON THE FRONT PAGE  
OF A UNIVERSITY WEBSITE

THINGS PEOPLE GO TO  
THE SITE LOOKING FOR



# Webpage Options

- Your own course page. (Use the Math 8001 as a template, if needed.)
  
- Course Management Systems, e.g. Moodle.

# Incorporating Technology in Class

There's a wide spectrum here.

- Technology can be a major component of the class (think: Math 2374).

This can work well, or poorly, depending on whether the technology is truly an integral part of the course.

(What happens when somebody else teaches the course?)



# Incorporating Technology in Class

- At a minimal level, you can use applets or programs as in-class demonstrations. Issues:
  - ▶ Set everything up beforehand!
  - ▶ Ask yourself: will this actually help? When should I use the applet?
  - ▶ How to find good applets? (MAA Course Communities?)  
(What makes for a “good” applet?)

# Online Homework Systems

WeBWork is one of many web-based homework systems, all of which have several common features:

- Questions are *randomized*, so that each student gets the same types of problems, but with numbers slightly changed.
- Can do multiple choice, matching, T/F questions, etc.
- Can check decimal answers ( $1.73\dots$ ), exact answers ( $\sqrt{3}/2$ ), intervals ( $[0, 1]$ ), expressions ( $x^2 - x + 1$ ), inequalities ( $-1 \leq x < 2$ ) or equations ( $y = 3x - 1$ )

# WebAssign Entry

## 1. algl-rn

Evaluate each expression if  $a = 1.4$ ,  $b = 24$ , and  $c = 1/4$ . Numbers in red are randomized.

a)  $0.2 + a =$

b)  $abc =$    
Enter a number.

c)  $3c - ab =$

Grade This

Show Answer

Try Again

# WebAssign Response

1. algl-rn

Evaluate each expression if  $a = 1.4$ ,  $b = 24$ , and  $c = 1/4$ . Numbers in red are randomized.

a)  $0.2 + a =$   ✓

b)  $abc =$   ✗ Check the syntax of your response.

c)  $3c - ab =$   ✗ Check the syntax of your response.

Grade This

Show Answer

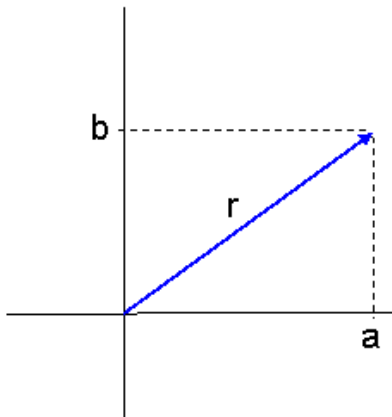
Try Again

# WebAssign MathPad

1. + 1/1 points All Submissions  Notes

## Symbolic

Write an equation for the length of the blue line labeled  $r$  in the image below?



mathPad  
BETA

$+$   $-$

$\times$   $\div$

$\frac{\square}{\square}$   $\sqrt{\square}$

Functions

Symbols

Relations

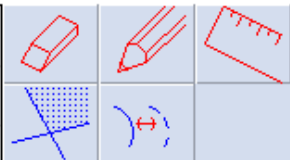
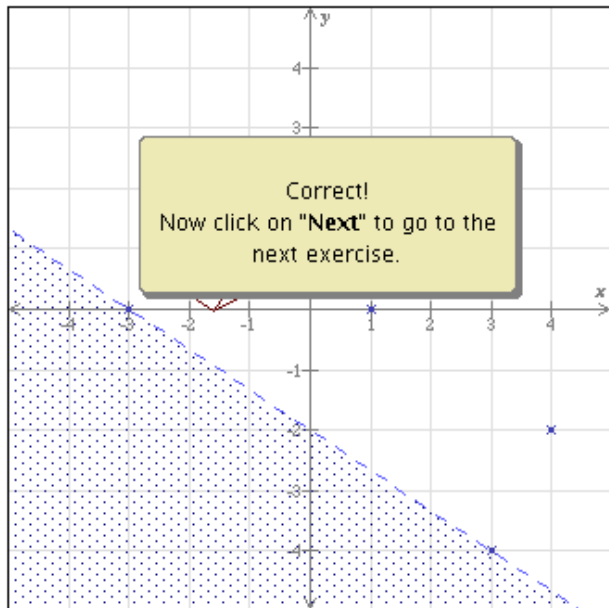
Sets

Trig

$\sin$   $\cos$

$\sin^{-1}$   $\cos^{-1}$

# ALEKS Graphical Entry I



Clear Undo

# ALEKS Graphical Entry II

## Question #2

Assessment Progress



Graph the solution to the inequality on the number line.

$$|x + 5| < 4$$

### Quick Help



[How do I enter my solution?](#)

A number line graphing interface. The number line ranges from -11 to 11 with tick marks every 1 unit. To the right of the number line is a toolbar with icons for erasing, drawing a line, drawing a point, and drawing an inequality symbol. Below the toolbar are three buttons: 'Clear', 'Undo', and 'Help'.

Next >>

I don't know

## Webwork at UMN

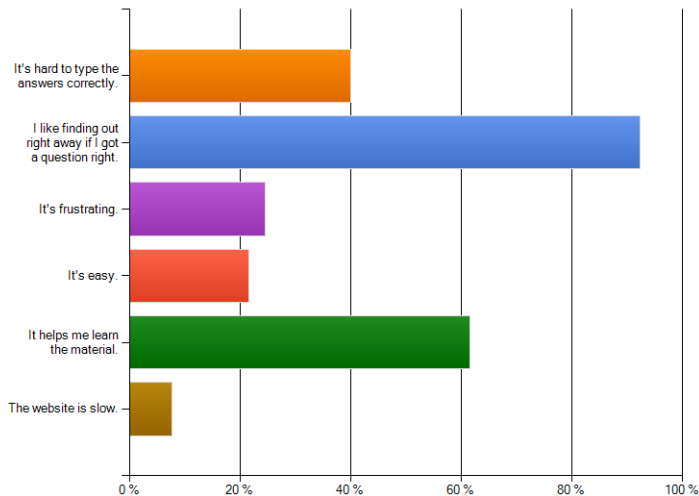
We chose Webwork because of its cost, flexibility, and our computer geekiness.

- Started in 2009 with 165 students in UMTYMP Algebra
- Currently used regularly by 900 students, in a range of courses.
- UMTYMP **always** uses it in conjunction with other written homework or quizzes. The goal is to give students more feedback on the “drill” type problems which weren’t always graded.



# UMTYMP Calculus I Opinions

What do you think of the WeBWorK system? (Check all that apply)



## Effect of WeBWork on Homework Time

Before Webwork, most of our UMTYMP Algebra students spent 6-10+ hours on their homework each week. With Webwork:

3. On average, how much time does it take to complete your UMTYMP Algebra homework?

	0-2 Hours	2-4 Hours	4-6 Hours	6-8 Hours
Online WeBWork Portion	<b>67.3% (109)</b>	29.0% (47)	3.1% (5)	0.6% (1)
Handwritten Portion	34.0% (55)	<b>49.4% (80)</b>	12.3% (20)	3.7% (6)
TOTAL	8.0% (13)	28.4% (46)	<b>38.9% (63)</b>	17.3% (28)

Student performance on quizzes and exams has remained consistent with previous years.

# AMS Homework Software Survey

## Key Findings

Overall, users were happy with homework software; almost no department discontinued or reduced its use.

Current users were more positive about the benefits of homework software than prospective users and much less concerned about drawbacks than prospective users: the primary benefit being better student learning; the primary drawback being students not showing their work.

*Notices of the AMS, Vol. 57, No. 6 (June/July 2010), p.753*

Demonstration time!

# Homework

Your HW: login with your x500 id and your student ID as your password. Complete the "Orientation" assignment and at least some of another assignment of your choice.