Teaching and Tutoring Math Online

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Synchronous Teaching and Tutoring

Hendrick Best Practices for Adult Learners Conference

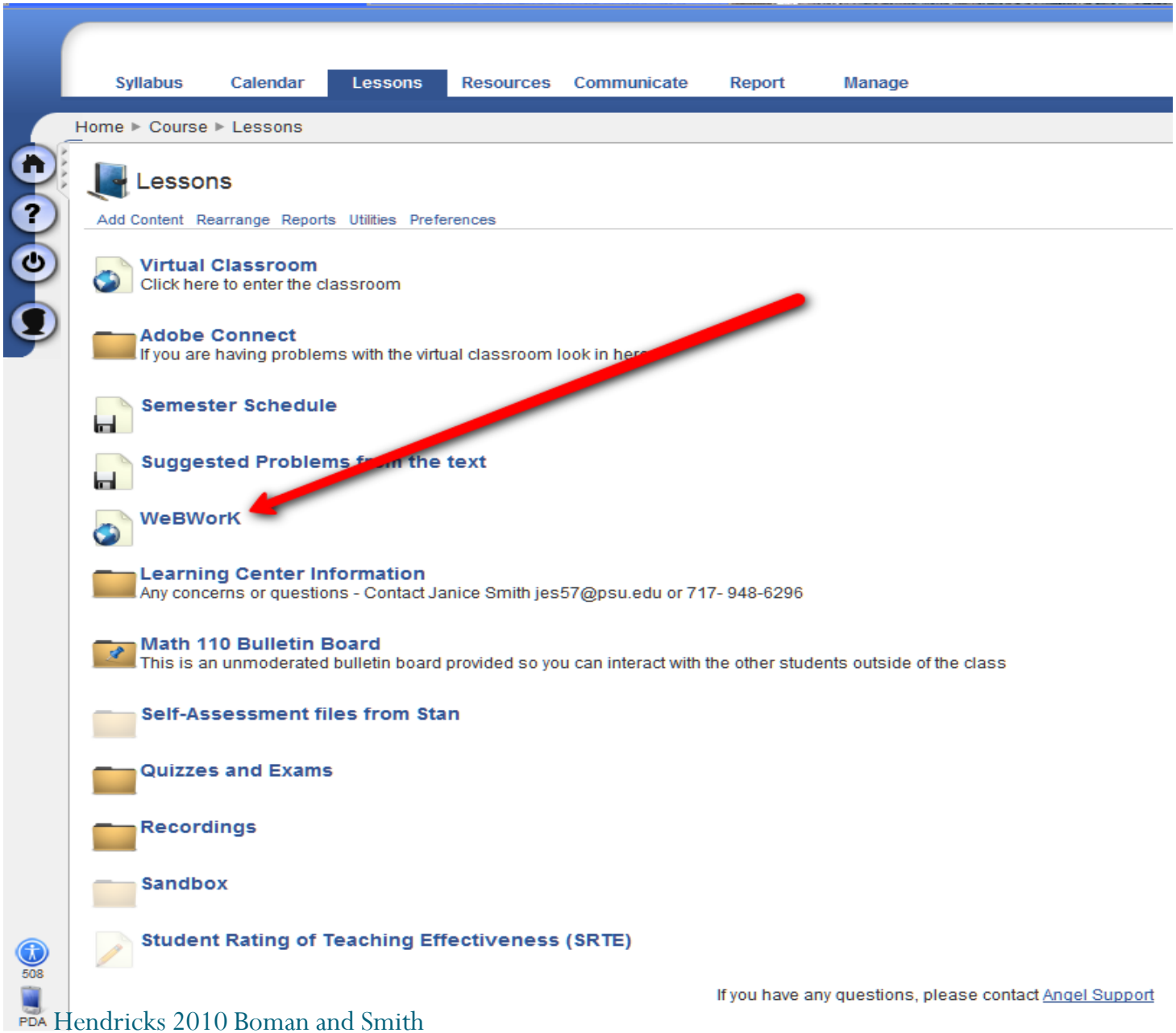
May 10, 2010

Penn State University

Teaching

Three Basic Tools

- ANGEL
- WeBWorK
- Adobe Connect



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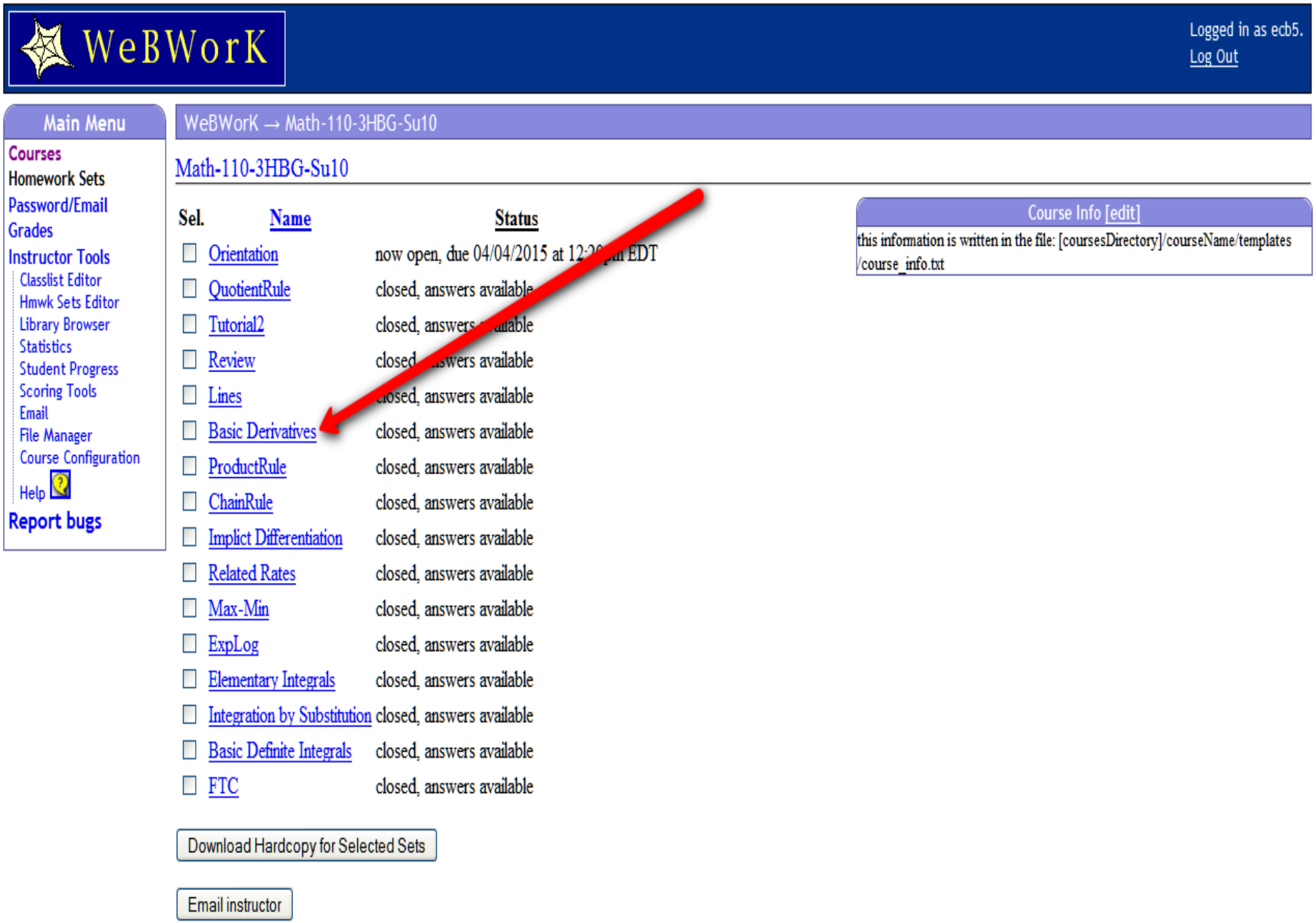
WeBWorK
Logged in as ecb5.
Log Out
Main Menu
Courses
Homework Sets
Password/Email
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Instructor Tools
Classlist Editor
Hmwk Sets Editor
Library Browser
Statistics
Student Progress
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File Manager
Course Configuration
Help
Report bugs
WeBWorK → Math-110-3HBG-Su10
Math-110-3HBG-Su10
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Status
Orientation
now open, due 04/04/2015 at 12:
EDT
QuotientRule
closed, answers available
Tutorial2
closed, answers
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Review
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swers available
Lines
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Basic Derivatives
closed, answers available
ProductRule
closed, answers available
ChainRule
closed, answers available
Implict Differentiation
closed, answers available
Related Rates
closed, answers available
Max-Min
closed, answers available
ExpLog
closed, answers available
Elementary Integrals
closed, answers available
Integration by Substitution
closed, answers available
Basic Definite Integrals
closed, answers available
FTC
closed, answers available
Course Info [edit]
this information is written in the file: [coursesDirectory]/courseName/templates/course_info.txt
Download Hardcopy for Selected Sets
Email instructor

WeBWorK

Logged in as ecb5.
Log Out

Main Menu

- Courses
- Homework Sets
  - Basic Derivatives
- Password/Email
- Grades
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  - Scoring Tools
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  - File Manager
  - Course Configuration
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- Report bugs

Sets

- Basic Definite Integrals
- Basic Derivatives
- ChainRule
- Elementary Integrals
- ExpLog
- FTC
- Implict Differentiation
- Integration by Substitution
- Lines
- Max-Min
- Orientation
- ProductRule
- QuotientRule
- Related Rates
- Review
- Tutorial2

WeBWorK → Math-110-3HBG-Su10 → Basic_Derivatives

Basic Derivatives

This set is visible to students.

▲ Up

Download a hardcopy of this homework set.

Name	Attempts	Remaining	Worth	Status
Problem 1	0	unlimited	1	0%
Problem 2	0	unlimited	1	0%
Problem 3	0	unlimited	1	0%
Problem 4	0	unlimited	1	0%
Problem 5	0	unlimited	1	0%
Problem 6	0	unlimited	1	0%
Problem 7	0	unlimited	1	0%
Problem 8	0	unlimited	1	0%
Problem 9	0	unlimited	1	0%
Problem 10	0	unlimited	1	0%
Problem 11	0	unlimited	1	0%
Problem 12	0	unlimited	1	0%
Problem 13	0	unlimited	1	0%
Problem 14	0	unlimited	1	0%
Problem 15	0	unlimited	1	0%
Problem 16	0	unlimited	1	0%
Problem 17	0	unlimited	1	0%
Problem 18	0	unlimited	1	0%
Problem 19	0	unlimited	1	0%
Problem 20	0	unlimited	1	0%
Problem 21	0	unlimited	1	0%
Problem 22	0	unlimited	1	0%
Problem 23	0	unlimited	1	0%

Set Info [edit]

WeBWorK assignment number Basic_Derivatives is due : 02/03/2006 at 10:00pm EST.

The
(* replace with url for the course home page *)
for the course contains the syllabus, grading policy and other information.

This file is /conf/snippets/setHeader.pg you can use it as a model for creating files which introduce each problem set.

The primary purpose of WeBWorK is to let you know that you are getting the correct answer or to alert you if you are making some kind of mistake. Usually you can attempt a problem as many times as you want before the due date. However, if you are having trouble figuring out your error, you should consult the book, or ask a fellow student, one of the TA's or your professor for help. Don't spend a lot of time guessing -- it's not very efficient or effective.

Give 4 or 5 significant digits for (floating point) numerical answers. For most problems when entering numerical answers, you can if you wish enter elementary expressions such as $2 \wedge 3$ instead of 8, $sin(3 * pi/2)$ instead of -1, $e \wedge (ln(2))$ instead of 2, $(2 + tan(3)) * (4 - sin(5)) \wedge 6 - 7/8$ instead of 27620.3413, etc. Here's the list of the functions which WeBWorK understands.

You can use the Feedback button on each problem page to send e-mail to the professors.

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WeBWorK

Main Menu

- Courses
- Homework Sets
  - Basic Derivatives
    - Problem 4
- Password/Email
- Grades
- Instructor Tools
  - Classlist Editor
  - Hmwk Sets Editor
    - Basic Derivatives
      - 4
  - Library Browser
  - Statistics
    - Basic Derivatives
  - Student Progress
    - Basic Derivatives
  - Scoring Tools
  - Email
  - File Manager
  - Course Configuration
  - Help
- Report bugs

Problems

- Problem 1
- Problem 2
- Problem 3
- Problem 4
- Problem 5
- Problem 6
- Problem 7
- Problem 8

Basic Derivatives: Problem 4

(1 pt) **unionLibrary/setDervBasic/3-4-03.pg**

Let $y = x^7$. Find $\frac{dy}{dx}$.

$\frac{dy}{dx} =$ 7x^6

Edit this problem

☐ Show correct answers

Preview Answers | Check Answers

You have attempted this problem 0 times.
This homework set is closed.

Show Past Answers

Email instructor

This set is visible to students.

Page generated at 3:07pm on May 4, 2010

Main Menu
Courses
Homework Sets
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Problems
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Problem 9
Problem 10
Problem 11
Problem 12
Problem 13
Problem 14

Basic Derivatives: Problem 4

Previous | Prob. List | Next

ANSWERS ONLY CHECKED -- ANSWERS NOT RECORDED

Entered	Answer Preview	Result
7*(x^6)	$7x^6$	correct

The answer above is correct.

(1 pt) **unionLibrary/setDervBasic/3-4-03.pg**

Let $y = x^7$. Find $\frac{dy}{dx}$.

$\frac{dy}{dx} =$ 7x^6

Edit this problem

Show correct answers

Preview Answers | Check Answers

You have attempted this problem 0 times.
This homework set is closed.

Show Past Answers

Email instructor

This set is visible to students.

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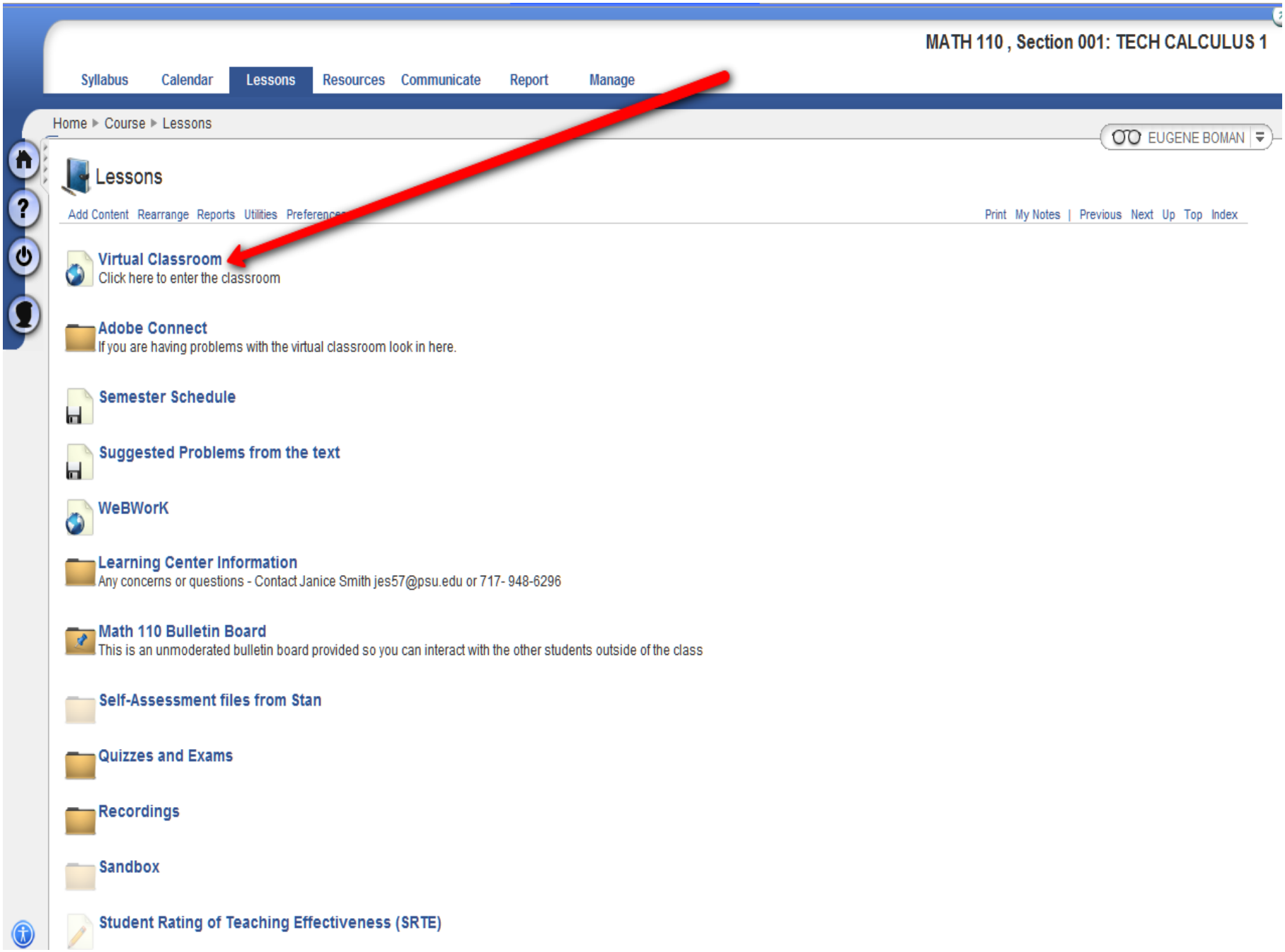
MATH 110 , Section 001: TECH CALCULUS 1
Syllabus
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Home ▸ Course ▸ Lessons
EUGENE BOMAN
Lessons
Add Content Rearrange Reports Utilities Preferences
Print My Notes | Previous Next Up Top Index
Virtual Classroom
Click here to enter the classroom
Adobe Connect
If you are having problems with the virtual classroom look in here.
Semester Schedule
Suggested Problems from the text
WeBWorK
Learning Center Information
Any concerns or questions - Contact Janice Smith jes57@psu.edu or 717- 948-6296
Math 110 Bulletin Board
This is an unmoderated bulletin board provided so you can interact with the other students outside of the class
Self-Assessment files from Stan
Quizzes and Exams
Recordings
Sandbox
Student Rating of Teaching Effectiveness (SRTE)

Ex: Find all extrema of

$$f(x) = \frac{1}{3}x^3 - 2x^2 + 3x + 1$$

$$f'(x) = x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x = 1$$

$$x = 3$$

critical points

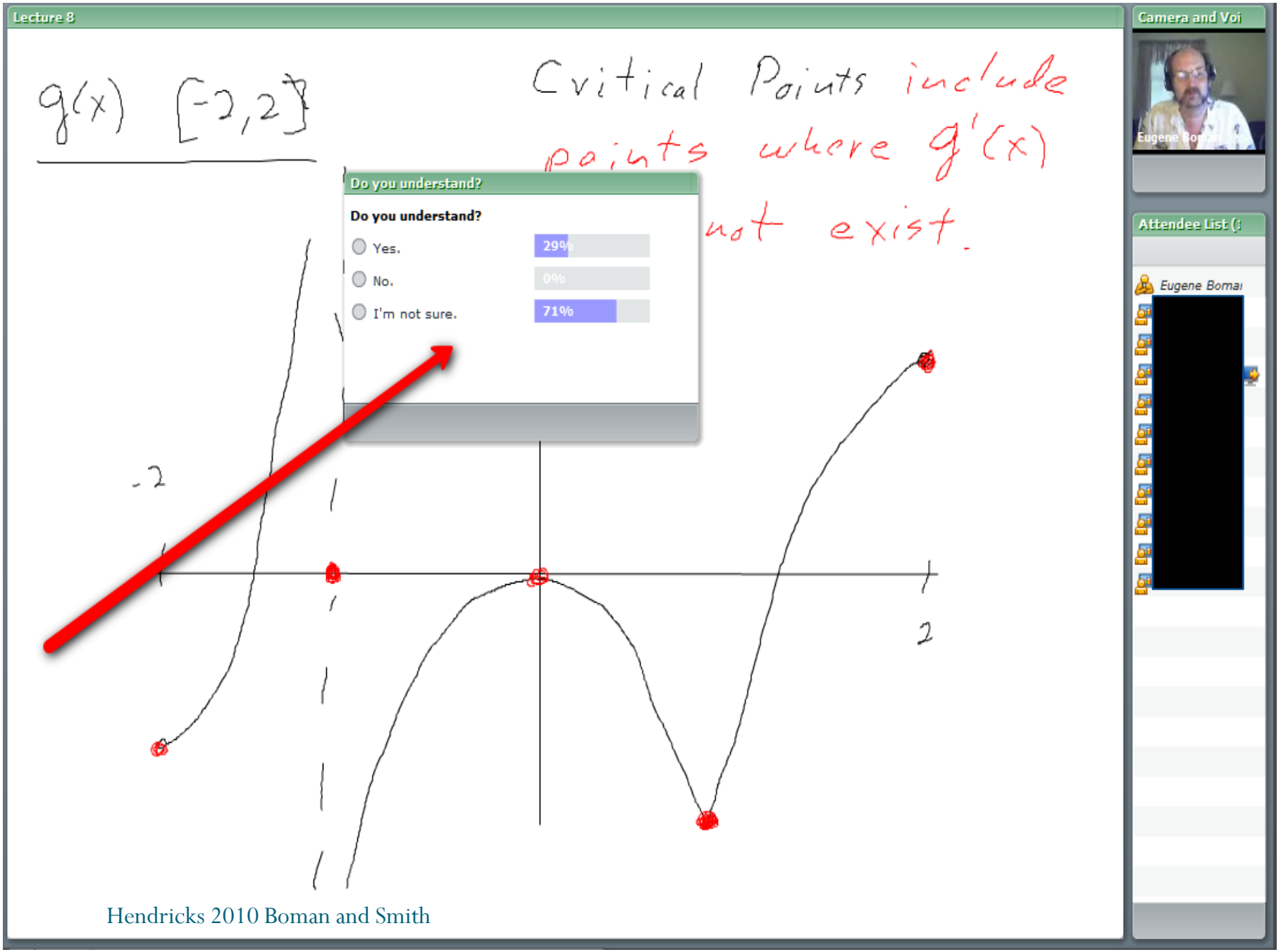
solutions

$$f''(x) = 2x - 4$$

2nd Deriv. Test

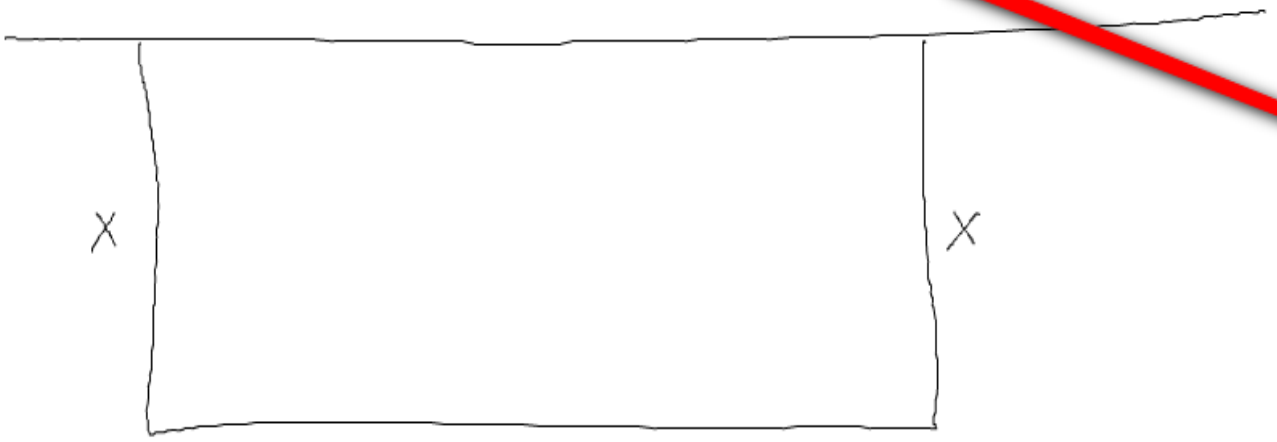
$f''(1) = -2 < 0$ max at $x = 1$

$f''(3) = 6 - 4 = 2 > 0$


Lecture 8
Camera and Voi
Eugene Boman
Attendee List (1
Eugene Boman
g(x) [-2,2]
Critical Points include points where g'(x) not exist.
Do you understand?
Do you understand?
Yes. 29%
No. 0%
I'm not sure. 71%
-2
2

Lecture 8

Ex: 3 Pgs 40 ft of fencing



$x + x + y = 40$

$2x + y = 40$

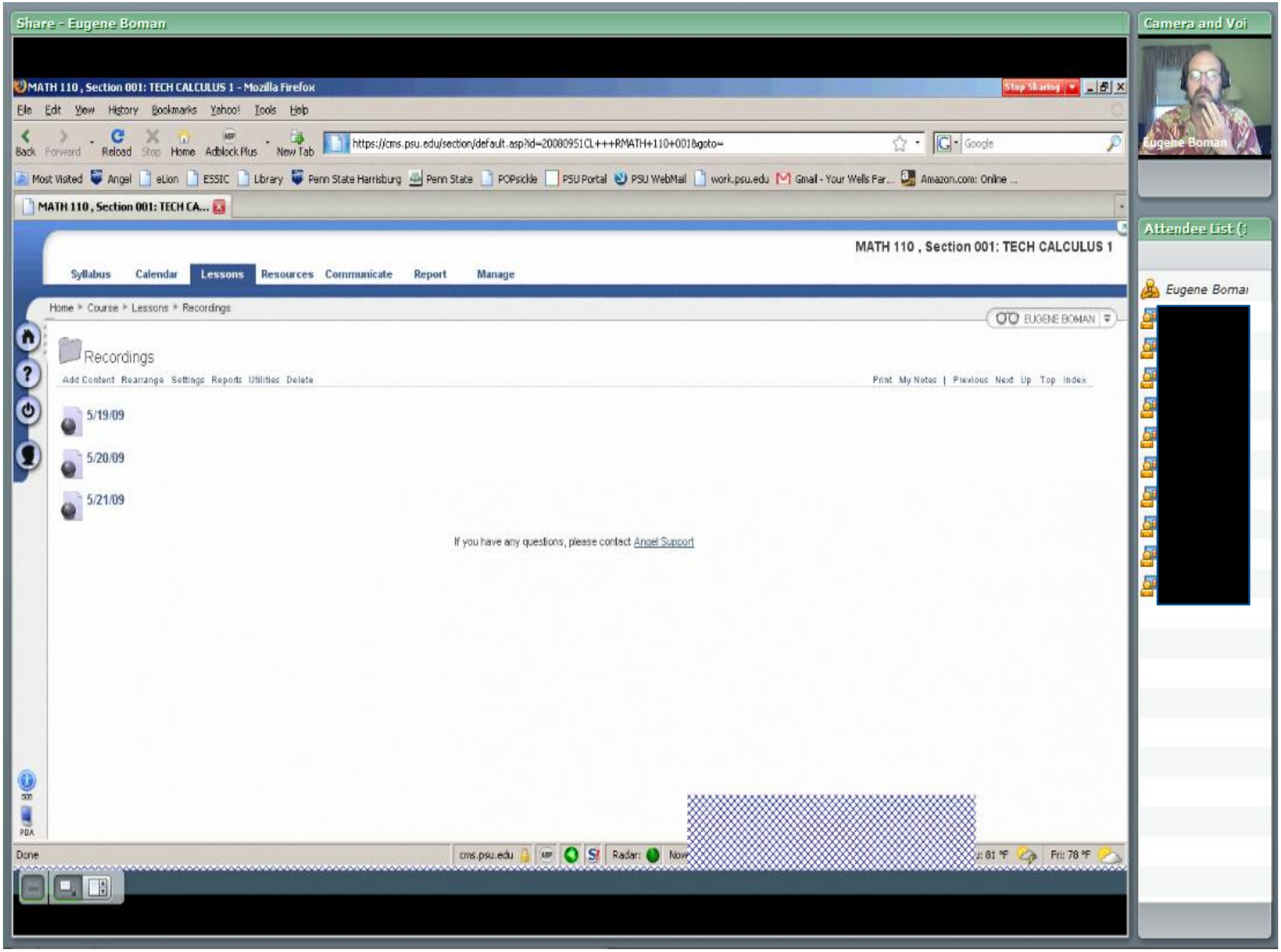
$y = 40 - 2x$

Camera and Voi

Eugene Boman

Attendee List (

Eugene Boma


Share - Eugene Boman
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5/20/09
5/21/09
If you have any questions, please contact Angel Support
Done
cms.psu.edu
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Camera and Voi
Eugene Boman
Attendee List (
Eugene Boman

Tutoring

Why online?

- Convenience
- Equity
- Accreditation

Multiple Populations

Adult Learners in face-to-face classes

- Face-to-face possible but inconvenient
  - Meet during lunch hour
  - As child is napping
  - At the airport
  - Etc.

Students in an on-line class

- Face-to-face not possible
- Geographically dispersed

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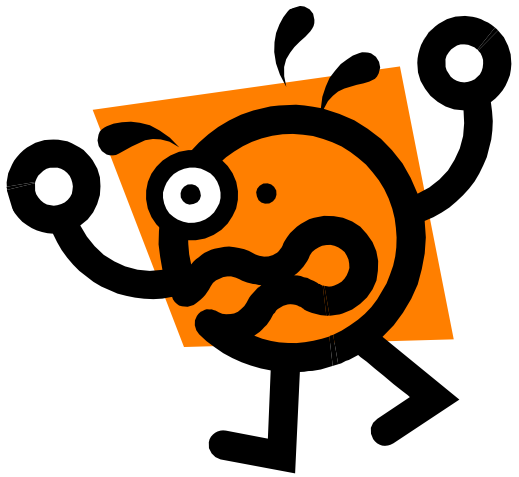
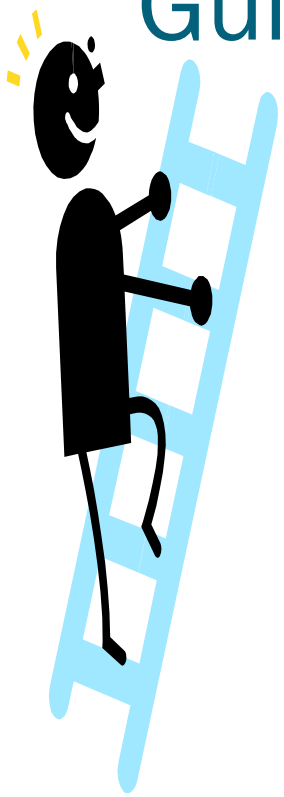
Online Misconceptions



What's the turn-around time?

Can't I just email the paper or send you the homework problem?

Guiding Principles



1. Minimize differences in technology tools between student and tutor
2. Student an active participant
   - Keep it similar to face-to-face interactions
   - Resist editing or telling
3. Success depends on process, not the tools used (Turrentine & MacDonald, 2006)
   - Define what can/cannot be accomplished
   - "see and hear" each other without video or sound; especially careful with tone if using chat only
   - Same face-to-face best practices in tutoring process

Practical Considerations

1. Professor/Tutor collaborations
   - Embed tutoring information into the course
   - Know assignments
   - Tutor has an online presence in the class

MATH 110 , Section 001: TECH CALCULUS 1 - Mozilla Firefox

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MATH 110 , Section 001: TECH CALCU...

MATH 110 , Section 001: TECH CALCULUS 1

Syllabus Calendar Lessons Resources Communicate Report Manage

Home ▸ Course ▸ Lessons ▸ Learning Center Information

Janice Sm

Learning Center Information

Any concerns or questions - Contact Janice Smith jes57@psu.edu or 717- 948-6296

Add Content Rearrange Settings Reports Utilities Delete

Print My Notes | Previous Next Up Top I

Scheduling a virtual math tutoring session using Adobe Connect
Tutor is Janice Smith of the Learning Center

Learning Center Web page link
See all the services of the Learning Center here.

But I understood it in class!
You can't get exercise by watching an exercise video!

If you have any questions, please contact Angel Support

508

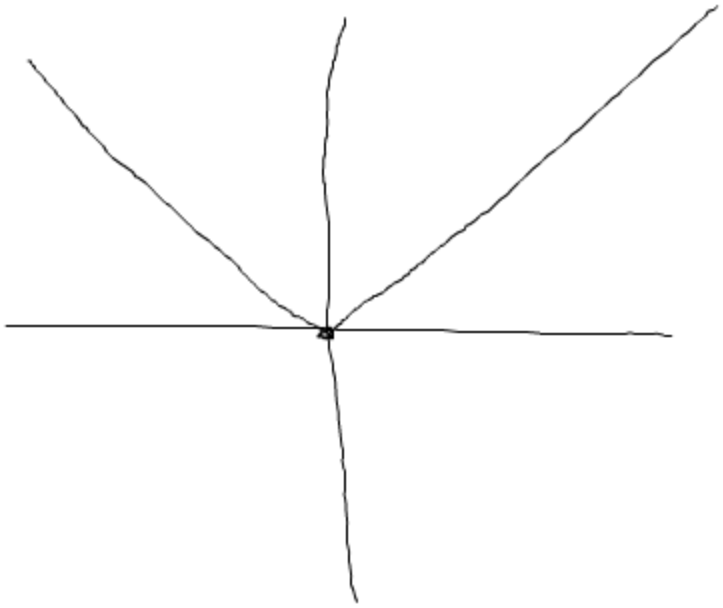
PDA

ture 1

Ex: Absolute Value

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

x	y = |x|
0	0
1	1
-1	1
-2	2



Camera and V

Attendee List
My Status:Ac
nice Smith

5

Stop Sharing Full Screen

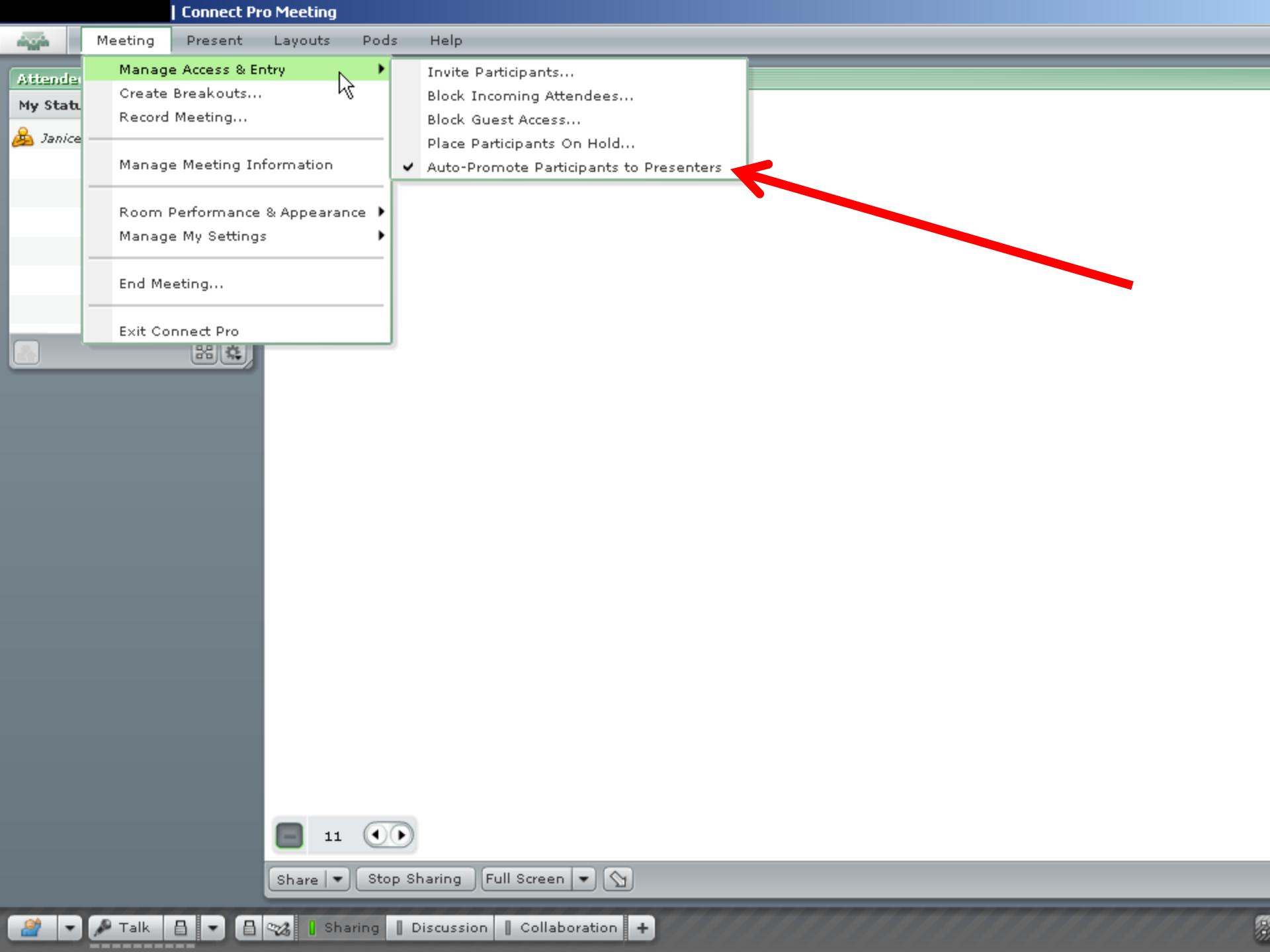
Talk

Practical Considerations (con't)

2. Options for chat or audio
   - Audio required for math
   - Tutor used headset with microphone
   - Students had audio and mic capabilities (could use chat function)

Practical Considerations (con't)

3. Transparent technology platform
   - Match the class platform if possible
     - More important in math than writing support
     - Use Adobe Connect
   - Use of a tablet mouse for math (THANKS to the Commission for Adult Learners Incentive Grant)
     - Ask the student what to write as the next step or symbol


Connect Pro Meeting
Meeting
Present
Layouts
Pods
Help
Manage Access & Entry
Create Breakouts...
Record Meeting...
Manage Meeting Information
Room Performance & Appearance
Manage My Settings
End Meeting...
Exit Connect Pro
Invite Participants...
Block Incoming Attendees...
Block Guest Access...
Place Participants On Hold...
Auto-Promote Participants to Presenters
11
Share
Stop Sharing
Full Screen
Talk
Sharing
Discussion
Collaboration

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Bounded Area:

$y = 3x^3 - x^2 - 10x$

$y = -x^2 + 2x$

$-x^2 + 2x = 3x^3 - x^2 - 10x$

$-2x \qquad -2x$

$3x^3 - 12x = 0$

$3x(x^2 - 4) = 0$

$3x = 0$

$x = 0$ $\quad x = 2 \quad x = -2$

Practical Considerations (con't)

4. Approval for Alternate Work Arrangements
   - Wage payroll tutors working from home

5. Adobe Connect license needed
   - From IT department

Pilot for math (summer 09)

- Math 110 (entirely online)
  - 11 enrolled students
  - 4 tutored (3 adult learners)
- 3 other math courses (face-to-face)
  - 2 students tutored online (1 adult learner)
  - One calculus, one algebra

Needed

- Publicity for online tutoring option for face-to-face courses
  - Not yet in the campus culture
- Training for tutors
  - Must be experienced in face-to-face tutoring

References

Turrentine, P., & MacDonald, L. (2006). Tutoring online: Increasing effectiveness with best practices. *NADE Digest 2*(2), 9-18.

Miller, S. (2001). Tutoring online to retain students and promote success. In C. Dalziel & M. Payne (Eds), *Quality enhancing practices in distance education* (pp. 66-84). Washington, D.C.: Instructional Telecommunications Council.