# Changing how math is taught and learned using MyMathLab

By Hamza Duhaini

#### **About Me**

Name: Hamza Duhaini (Lebanon).

Math and Physics Department Supervisor at ABP affiliated with Qatar foundation

#### Education

- Master of Science degree in Mathematics
- Teaching diploma in Mathematics

(American University of Beirut)

#### Experience

- Twenty Three years of teaching Mathematics
- Various curriculum:
   American high school
   International baccalaureate (IB),
   IGCSE and A level
   Lebanese baccalaureate

#### **About ABP**

- The Academic Bridge Program (ABP), a center of Qatar Foundation for Education, Science and Community Development
- ABP was established in 2001

#### **About ABP**

- A pre-university program established for high school graduates from Qatar and other countries in the region
- More than 2,500 students have graduated from our program.

#### **About ABP**

 The ABP is a rigorous two-semester general studies program which focuses on English, math, science and computer skills

#### **About ABP**

 ABP also partners with the universities at Qatar Foundation to offer cross-registration, an exceptional opportunity for students to prove that they are ready for university studies. The Challenges students face in Learning Mathematics

### The challenges

Lack of motivation and interaction

### The challenges

 Memorizing instead of understanding mathematical principles

#### The challenges

 Difficulty with vocabulary and terminology of mathematics, understanding directions and explanations, or translating word problems

### The challenges

 Trouble learning or recalling concepts, definitions and meanings of abstract terms;

### The challenges

 Difficulty reading texts to direct their own learning and communicating mathematics, including asking and answering questions;

### The challenges

• Emotional block to mathematics originally due to Math anxiety.

## Solution

# Welcome to MyMathLab

What is MyMathLab?

## MyMathLab

is an online tutorial, homework, and assessment system for mathematics courses.

## MyMathLab

has helped over 9 million students succeed in their math and stats classes since 2001

# MyMathLab is

Personalized.

# MyMathLab is

Interactive.

## MyMathLab is

Effective.

What can students do with MyMathLab?

# With MyMathLab students can

 Practice and learn mathematics when and where they want, and at their own pace.

# With MyMathLab students can

 Work through unlimited tutorial exercises correlated to the exercises in their textbook and get immediate feedback on their answers.

# With MyMathLab students can

 Receive a personalized study plan to diagnose areas where they need to practice.

# With MyMathLab students can

 Access a multimedia textbook with links to learning aids, such as animations and videos.

# With MyMathLab students can

 Use online tools, such as a discussion board or virtual classroom, to communicate with the teachers and other students.

# With MyMathLab students can

 Feel as if they have their own personal tutor, always available, and dedicated to their success.

# What can Instructors do with MyMathLab?

# With MyMathLab Instructors can

 Deliver all or a portion of their course online, whether the course is based in a lab or in a traditional classroom.

# With MyMathLab Instructors can

 Create and assign online homework, quizzes and tests that are automatically graded and tightly correlated to their textbook.

# With MyMathLab Instructors can

 Manage and track students' results in a powerful online gradebook designed specifically for Mathematics and Statistics.

# With MyMathLab Instructors can

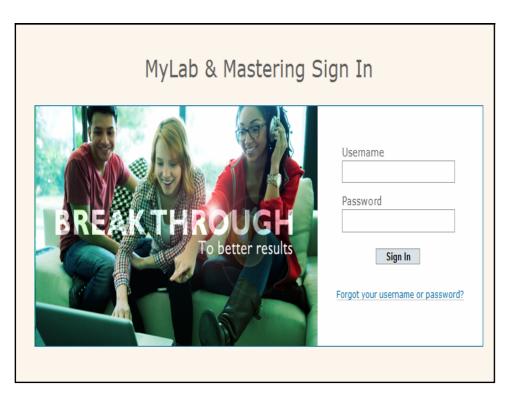
 Customize their courses depending on their syllabus and their students' needs.

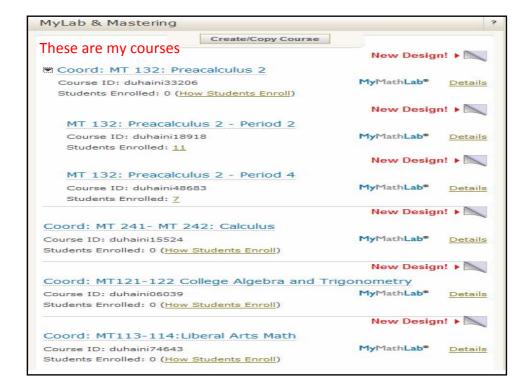
# With MyMathLab Instructors can

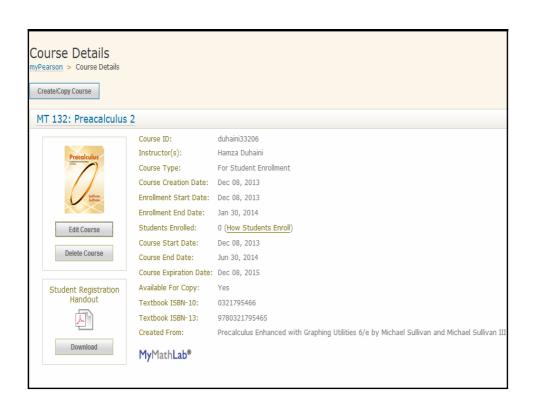
 Use a variety of communication tools to create a supportive online community for their students

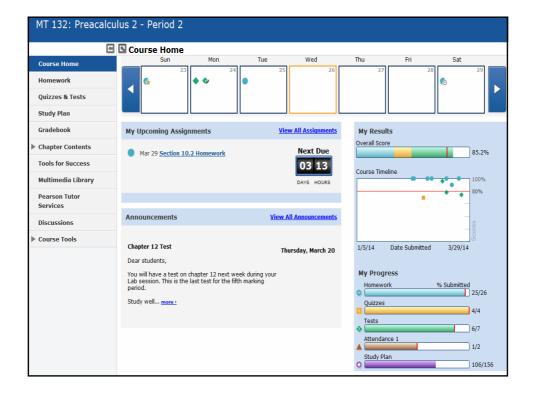
### Navigation Through MyMathLab



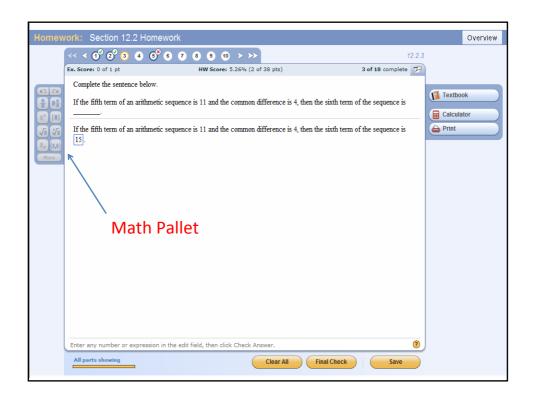


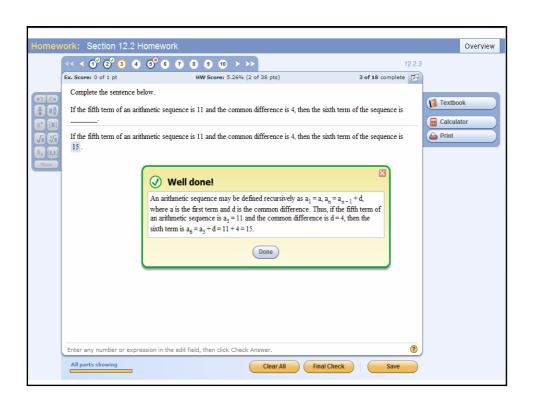


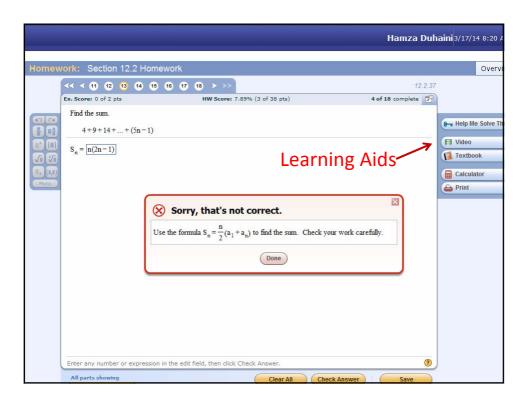


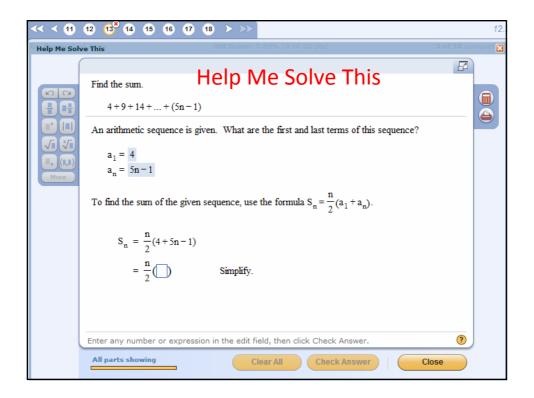


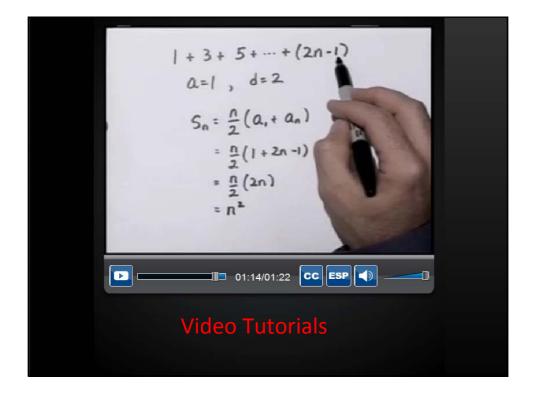
•	Homev	vork	
Course Home	02/08/14	H Section 7.3 Homework	
Homework	11:59pm	Section 7.5 Homework	
Ouizzes & Tests	02/08/14 11:59pm	Section 7.4 Homework	
Study Plan	02/15/14 11:59pm	⊕ Section 7.5 Homework	
Gradebook	02/22/14 11:59pm	H Section 7.6 Homework	100%
► Chapter Contents	02/22/14 11:59pm	H Section 7.7 Homework	100%
Tools for Success	02/15/14 11:59pm	(1) Chapter 7 Review Homework	
Multimedia Library	02/22/14 11:59pm	① Chapter 7.6 -7.7 Review homework	100%
Pearson Tutor Services	03/08/14 11:59pm	H Section 8.1 Homework	100%
Discussions	03/08/14 11:59pm	Section 8.2 Homework	100%
Course Tools	03/23/14 11:59pm	H Section 8.4 Homework	100%
, 604136 16613	03/10/14 11:59pm	H Chapter 8 Review Homework	100%
	03/15/14 11:59pm	Section 12.1 Homework	100%
	03/23/14 11:59pm	H Section 12.2 Homework	89.47%
	03/23/14 11:59pm	Section 12.3 Homework	100%
	03/23/14 11:59pm	Section 12.5 Homework	100%
	03/23/14 11:59pm	(1) Chapter 12 Review Homework	100%
	03/29/14 11:59pm	Section 10.2 Homework	













#### 3 Find the Sum of an Arithmetic Sequence

The next result gives two formulas for finding the sum of the first n terms of an arithmetic sequence.

#### **THEOREM**

#### Sum of the First n Terms of an Arithmetic Sequence

Let  $\{a_n\}$  be an arithmetic sequence with first term  $a_1$  and common difference d. The sum  $S_n$  of the first n terms of  $\{a_n\}$  may be found in two ways:

$$S_n = a_1 + a_2 + a_3 + \dots + a_n$$

$$= \sum_{k=1}^{n} [a_1 + (k-1)d] = \frac{n}{2} [2a_1 + (n-1)d]$$

$$= \frac{n}{2} (a_1 + a_n)$$
(4)

#### **Textbook**

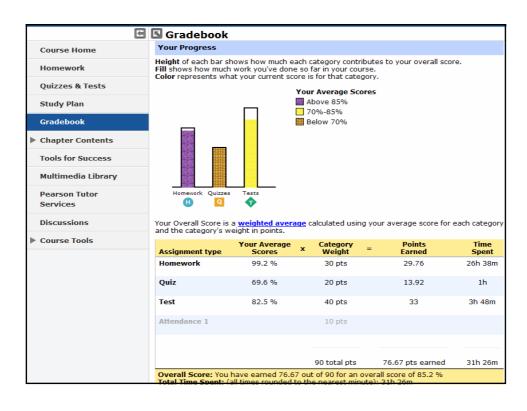
#### Proof

$$\begin{split} S_n &= a_1 + a_2 + a_3 + \dots + a_n & \text{Sum of first $n$ terms} \\ &= a_1 + (a_1 + d) + (a_1 + 2d) + \dots + [a_1 + (n-1)d] & \text{Formula (2)} \\ &= \underbrace{(a_1 + a_1 + \dots + a_1)}_{n \text{ terms}} + [d + 2d + \dots + (n-1)d] & \text{Rearrange terms.} \end{split}$$
 
$$= na_1 + d[1 + 2 + \dots + (n-1)]$$
 
$$= na_1 + d \Big[ \frac{(n-1)n}{2} \Big] & \text{Formula (6, Section 12.1)}$$
 
$$= na_1 + \frac{n}{2}(n-1)d$$
 
$$= \frac{n}{2}[2a_1 + (n-1)d] & \text{Factor out } \frac{n}{2} \text{: this is Formula (3).}$$
 
$$= \frac{n}{2}[a_1 + a_1 + (n-1)d] & \text{Use Formula (2): this is Formula (4).} \end{split}$$

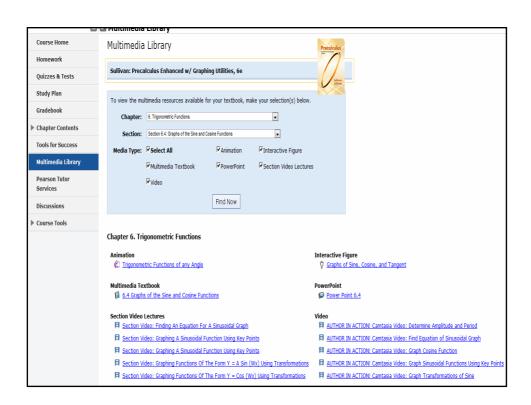
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Course Home	02/15/14 11:00pm	♦ Chapter 7.1-7.5 Take-Home-Test	90min	1 of 1			
Homework	02/24/14 11:59pm						
Quizzes & Tests	03/10/14 11:59pm						
Study Plan	03/13/14 2:00pm	♦ Chapter 8 Test	55min	1 of 1	77.78%		
Gradebook  Chapter Contents	03/26/14 2:00pm	♦ Chapter 12 Test	50min	1 of 1	74.29%		
Tools for Success		s and Quizzes and quizzes can be taken for practice or to build your study plan. Sample tests and	d quizzes	do not affe	ct your grade		
Pearson Tutor	Sample Tes	ts and Quizzes		Attempts	Gradebook Score		
Services	♦ Chapter 6 Pre-Test				91.23%		
Discussions	Section 6.1 Are You Prepared Quiz				40%		
Course Tools	Q Section	6.1 Concepts and Vocabulary Quiz		2 of ∞	87.5%		
	• Section	6.2 Are You Prepared Quiz		1 of ∞	100%		
	Section	6.2 Concepts and Vocabulary Quiz		1 of ∞	100%		
	Section	6,3 Are You Prepared Quiz		1 of ∞	75%		
	Section	6.3 Concepts and Vocabulary Quiz		1 of ∞	100%		
	Q Section	3 of ∞	66.67%				
	Q Section	1 of ∞	100%				
	Q Section	6.5 Are You Prepared Quiz		2 of ∞	100%		
	Q Section	6.5 Concepts and Vocabulary Quiz		2 of ∞	87.5%		

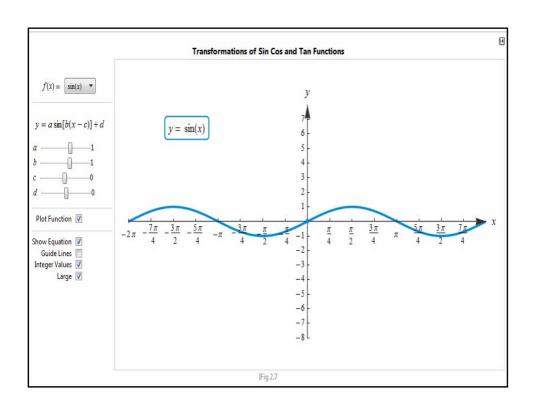
[	Study Plan	
Course Home	MT 132: Preacalculus 2 - Period 2 > STUDY PLAN	
Homework	Study Plan	
Quizzes & Tests	You have earned 106 of 156 mastery points (MP).	View progress
Study Plan	Practice these objectives and then take a Quiz Me to prove mastery and earn more points.	
Gradebook	★ Objectives to practice and master	View all chapters
► Chapter Contents	6.1 Angles and Their Measure	
Tools for Success	Convert from degrees to radians and from radians to degrees.	0 of 1 MP
Multimedia Library	6.2 Trigonometric Functions: Unit Circle Approach	
Pearson Tutor Services	✓ Use a calculator to approximate the value of a trigonometric function.  Practice  Quiz Me	0 of 1 MP
Discussions	★ Use a circle of radius r to evaluate the trigonometric functions.     Practice     Quiz Me	0 of 1 MP
Course Tools	6.3 Properties of the Trigonometric Functions	
Course Ioois	✓ Are You Prepared? Practice Quiz Me	0 of 1 MP
	6.4 Graphs of the Sine and Cosine Functions	
	✓ Determine the properties, amplitude, and period of sinusoidal functions.  ✓ Practice  Ouiz Me	0 of 1 MP
	Recently mastered	
	12.5 The Binomial Theorem	
	Use the Binomial Theorem.	1 of 1 MP
	S Use the Binomial Theorem.	1 of 1 MP

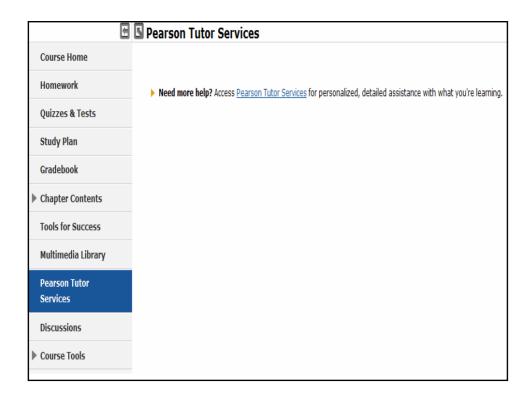
<b></b> G	radebook					
Res	ults from entire course to date.		Total	Score	Time Spent	Worked
•	Chapter 12 Test	Review	29/35	82.86%	37m 55s	03/24/14 12:05pm
<b>(1)</b>	Chapter 12 Review Homework	Review	38.33/50	76.67%	1h 2m 21s	03/23/14 11:09pm
<b>(1)</b>	Section 12.5 Homework	Review	13/17	76.47%	32m 24s	03/23/14 10:39pm
•	Section 12.3 Homework	Review	34.6/45	76.89%	1h 40m 32s	03/23/14 9:17pm
•	Section 12.2 Homework	Review	32/38	84.21%	1h 46m 46s	03/23/14 7:57pm
•	Section 12.1 Homework	Review	35.63/37*	96.3%	1h 17m 45s	03/15/14 10:15pm
•	Chapter 8 Test	Review	33/36*	91.67%	55m	03/13/14 10:21am
•	Chapter 8 Review Homework	Review	75.2/80	94%	2h 10m 49s	03/10/14 11:20pm
•	Chapter 7 Home-Test	Review	49/55	89.09%	24m 56s	03/10/14 12:01am
<b>(1)</b>	Section 8.3 Homework	Review	50/50	100%	1h 8m 48s	03/08/14 2:33pm
<b>(1)</b>	Section 8.2 Homework	Review	37/45	82.22%	1h 19m 20s	03/07/14 5:33pm
<b>(1)</b>	Section 8.4 Homework	Review	10/10	100%	21m	02/28/14 11:05am
Q	Take-Home Quiz 7.6 - 7.7	Review	18.62/36	51.72%	33m 52s	02/24/14 9:23pm
•	Section 8.1 Homework	Review	35/35	100%	1h 47m 3s	02/23/14 8:02pm
<b>(1)</b>	Section 7.6 Homework	Review	38.67/45	85.93%	2h 12m 32s	02/22/14 5:44pm
•	Chapter 7.6 -7.7 Review homework	Review	53.29/55	96.88%	2h 53s	02/22/14 5:01pm
<b>(1)</b>	Section 7.7 Homework	Review	20/20	100%	30m 8s	02/18/14 10:19am
<b>(1)</b>	Chapter 7 Review Homework	Review	95.5/120	79.58% (omitted)	1h 54m 1s	02/15/14 10:34pm
•	Chapter 7.1-7.5 Take-Home-Test	Review	28/38	73.68% (omitted)	1h 18m 19s	02/15/14

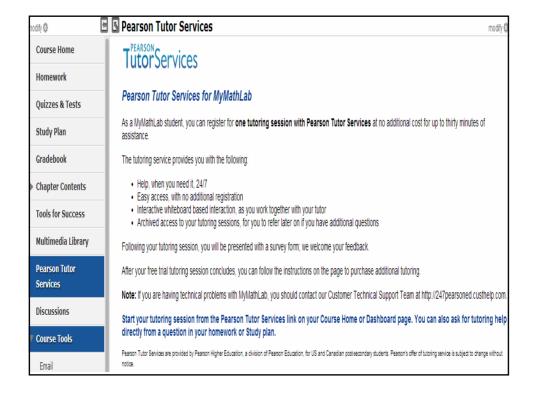


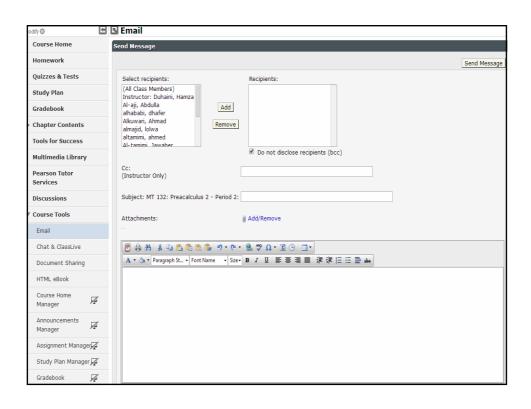


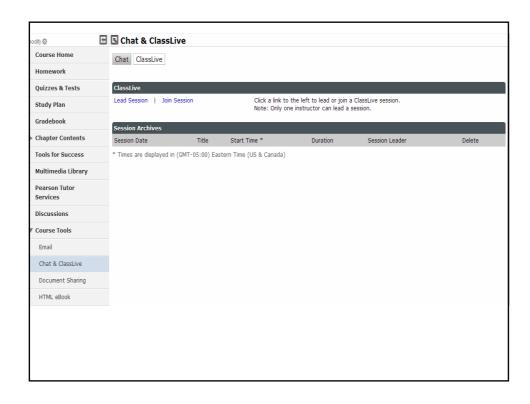


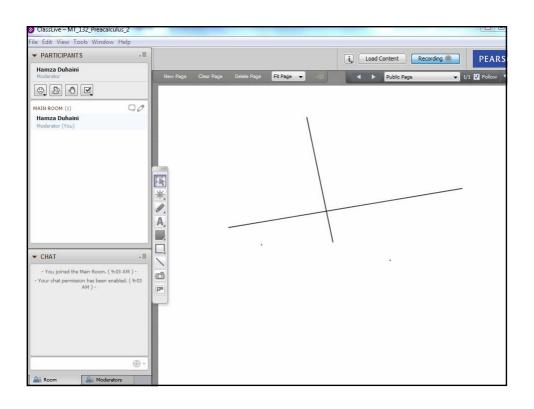


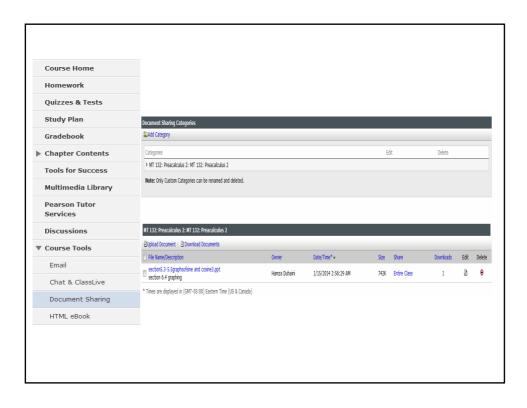


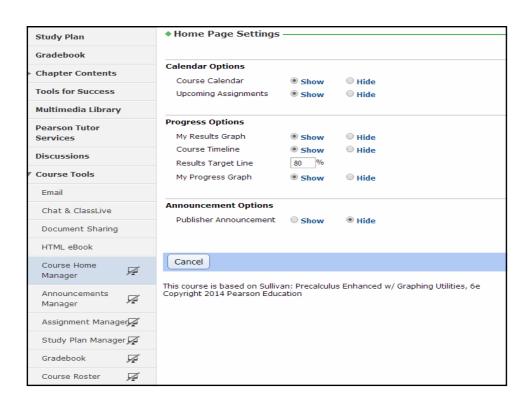


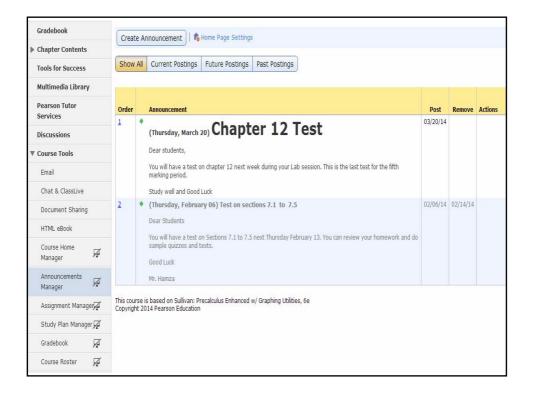


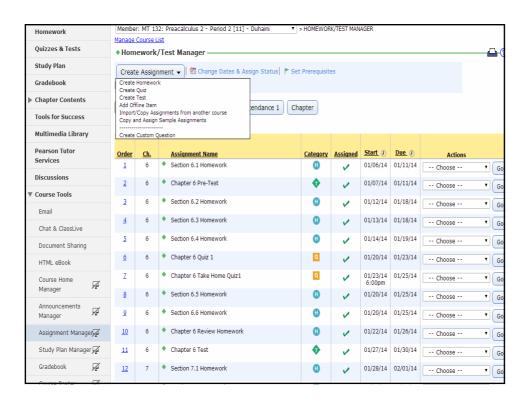


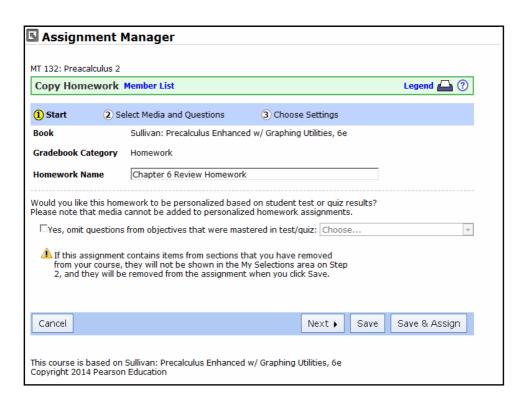






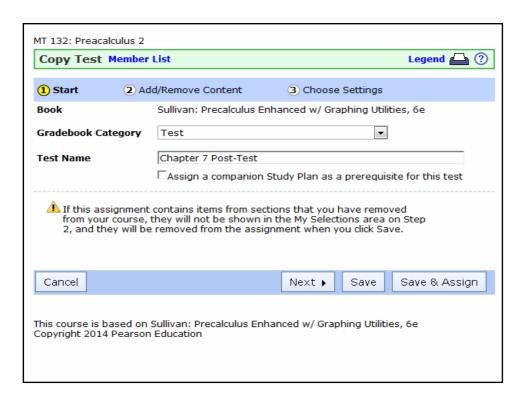


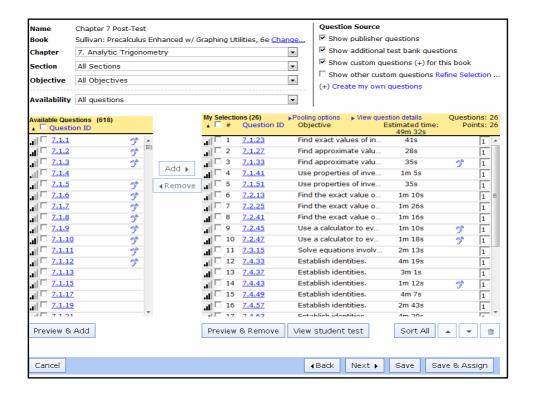




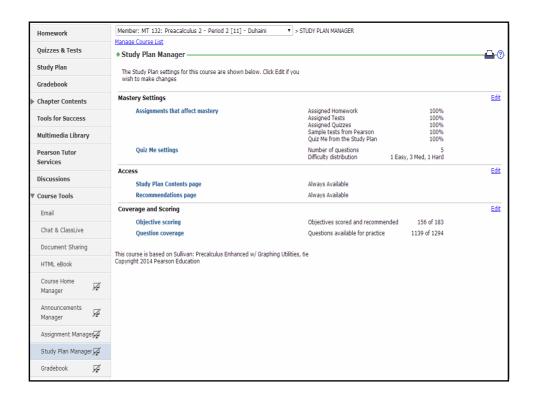
Name	Chapter 6 Re	eview Hor	nework				Question Source	2		
Book	Sullivan: Pre	calculus E	nhanced w/ 0	Graphing Ut	ilities, 6e <u>Char</u>	nge	☑ Show publishe	er questions		
Chapter	6. Trigonon	netric Fur	ctions			•	☐ Show additional test bank questions			
Section	All Sections					-	☑ Show custom	questions (+) for t	his book	
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Objective	All Objectiv	res				•	(+) Create my own questions			
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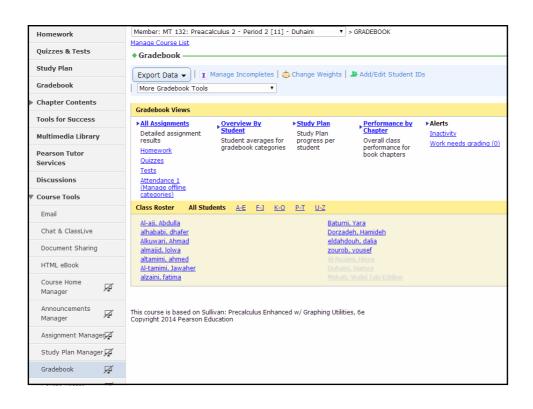
Name	Chapter 6 Review Ho	mework							
Book	Sullivan: Precalculus I	Enhanced w/ Graphing Utilities, 6e							
Availa	ability Options								
	Available 5/14/2014	12:00 AM							
	Due								
	Chapter Association	s Display with assignments from chapters: 6 Change Note: This assignment covers material from chapters 6							
Scori	ng Options								
	Late submissions	Allow students to work and change score after due date  Require password							
	Require final submission								
		☐ Deduct late submission penalty From final score   Penalty   W							
		Apply only to questions scored after the due date							
	Partial Credit	$\overline{m{arphi}}$ Allow partial credit on questions with multiple parts							
Acces	ss Controls								
	Prerequisites	None Change							
	Attempts per question	Limit number of times students can work each question to							
Prese	entation Options								
	Lock Correct Answers	□ Indicate and lock all correct answers after each Check Answer							
	Save Values	▼Save question values and student answers							
	Printing	✓ Allow students to print this homework assignment							
	Learning Aids	Help Me Solve This, Video, Animation, Textbook, Calculator, Instructor Tip Change							
		□Show in Review mode only							





Access Controls	
Password	Required password
Prerequisites	None Change
Number of Attempts	Limit number of attempts to
Incomplete Attempt	C Students have the Save for Later option. They can leave and return later to complete the test. They must answer in order, and cannot go back to previously viewed questions.
	• Students are expected to complete the test in one session
	<ul> <li>If attempt is interrupted, students may re-access and complete on their own</li> </ul>
	If attempt is interrupted, instructors must enable access
	<ul> <li>Restricted Access: Student cannot resume an incomplete attempt until the instructor enables access to it.</li> </ul>
	C Blocked Access: Student cannot access other assignments or questions while taking a test. If the student does not submit the test, access to all questions and assignments is blocked until the instructor enables access to or deletes the incomplete test.
Presentation Options	
Time Limit	Test time allowed (minutes):
	☐ Show time remaining during test
Question display	✓ Scramble question order for each student
Learning Aids	None Change
	□Show in Review mode only
Graphing	□Allow students to move points by typing coordinates
Review Options	
Results Display	Test Summary shows test score and question results ▼
Reviewing test	Student can review test any time after submitting
Study Plan	₹Results are used to update the study plan
Print	Allow students to print the test with the correct answers and their



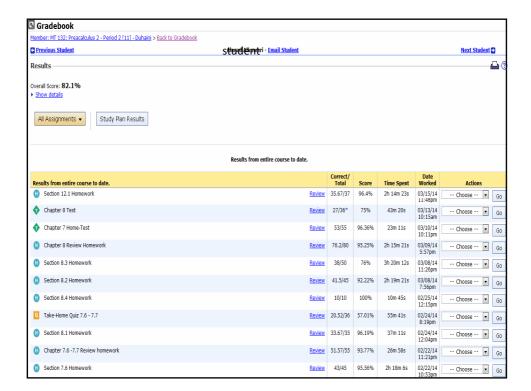


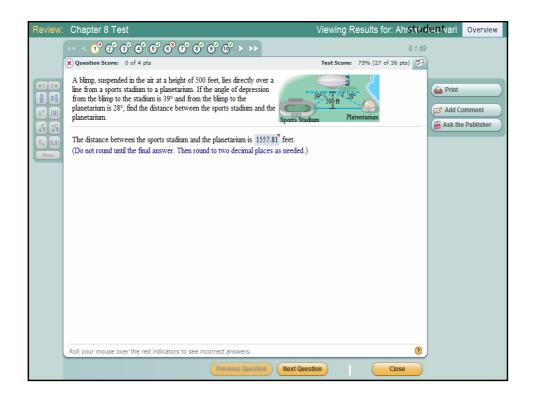
Overall Score	# of Results	• <u>Section</u> 12.1 Homework	• Section 12.2 Homework	• Section 12.3 Homework	Section 12.5 Homework	<ul> <li>Chapter</li> <li>12 Review</li> <li>Homework</li> </ul>	<ul><li>Chapter</li><li>12 Test</li></ul>
100%	-	2.1%	2.1%	2.1%	2.1%	2.1%	13.3%
77.9%		97.1% 🔼	92% 🔼	93.7% 🔼	93.6% IA	91.5% 🔼	66.7% 🔼
80.5%		96.3%	98.4%	95.6%	100%	94.7%	71.4%
	188	11	11	11	11	11	9
		<u>Change</u> <u>Scores</u>	<u>Change</u> <u>Scores</u>	<u>Change</u> <u>Scores</u>	<u>Change</u> <u>Scores</u>	<u>Change</u> <u>Scores</u>	<u>Change</u> <u>Scores</u>
71%	17	<u>96.3%*</u>	<u>50%</u>	<u>77%</u>	88.2%	73.3%	=
81.9%	17	<u>96.3%*</u>	100%	<u>95.6%</u>	88.2%	100%	54.3%
84.8%	17	99.9%*	<u>93.2%</u>	94.8%	<u>88.2%</u>	<u>88%</u>	91.4%
80.5%	17	96.3%*	84.2%	<u>76.9%</u>	<u>76.5%</u>	<u>76.7%</u>	82.9%
90%	16	99.9%*	100%	100%	88.2%	98.7%	omitted
85.2%	17	100%*	89.5%	100%	100%	100%	74.3%
63.3%	17	<u>96.3%*</u>	100%	91.9%	100%	88.7%	51.4%
74.8%	17	<u>99.9%*</u>	96.8%	100%	100%	94%	<u>57.1%</u>
87.8%	17	<u>96.3%*</u>	100%	100%	100%	97.3%	82.9%
61%	18	<u>100%</u>	98.4%	94.8%	100%	94.8%	34.3%
76.7%	18	<u>87.3%*</u>	100%	100%	100%	94.7%	71.4%

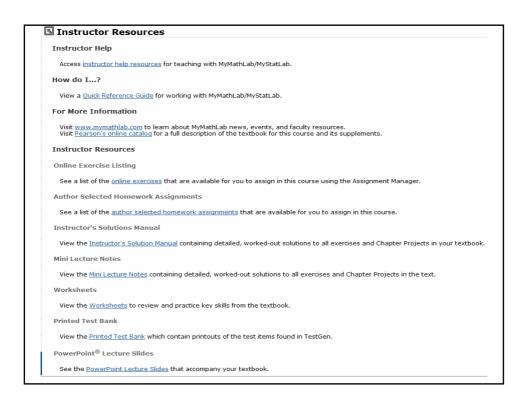
Overall Score	Homework 30 pt	<u>Ouizzes</u> 20 pt	Tests 40 pt
77%	95.9%	67.7%	67.4%
75.3%	94.7%	64.8%	66%
81.8%	96.1%	<u>87.6%</u>	68.2%
82.1%	93.9%	<u>57%</u>	<u>85.7%</u>
81.7%	94.6%	<u>51.7%</u>	86.9%
87.1%	99.5%	94.4%	74.1%
82%	97%	69.6%	<u>76.9%</u>
61.4%	87.4%	<u>56.7%</u>	44.2%
74.3%	99.2%	<u>79.6%</u>	52.9%
84.1%	99.2%	<u>73.1%</u>	<u>78.3%</u>
58.8%	97.7%	<u>50%</u>	33.9%
78.3%	95.4%	60.4%	<u>74.4%</u>

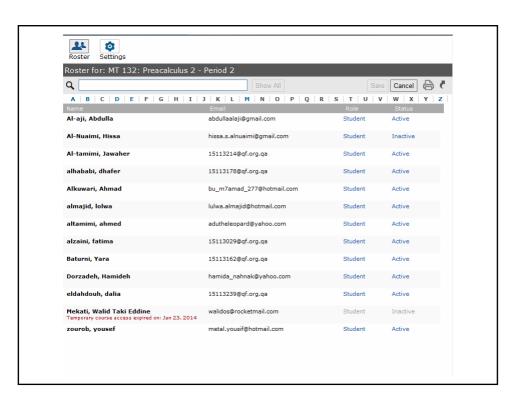
	Questions		C	bjectives		
Correct	Worked	Total	Mastered	Total	Score	Time Spent
9	35	999	83	139	59.71%	1h 27m 35s
8	14	999	92	139	66.19%	12m 24s
197	304	999	100	139	71.94%	14h 55m 47s
37	45	999	92	139	66.19%	50m 11s
110	199	999	100	139	71.94%	15h 49m 34s
123	185	999	98	139	70.50%	6h 7m 4s
140	188	999	78	139	56.12%	7h 4m 29s
54	164	999	81	139	58.27%	9h 21m 19s
8	58	999	103	139	74.10%	4h 21m 15s
67	81	999	77	139	55.40%	2h 14m 43s
6	12	999	95	139	68.35%	7m 14s

Book Contents	Homework		Tests (all attempts)	Study Pla
Ch. 6. Trigonometric Functions				70.8%
Ch. 7. Analytic Trigonometry	96.4%	65.5%	73.8%	72.9%
Section 7.1: The Inverse Sine, Cosine, and Tangent Functions			83.3%	78.4%
▶ Are You Prepared?				90.9%
▶ Concepts and Vocabulary				36.4%
Find exact values of inverse sine, cosine, and tangent functions.				81.8%
Find approximate values of inverse sine, cosine, and tangent functions.				100%
Use properties of inverse functions to find exact values of certain composite functions.			75%	63.6%
Find the inverse function of a trigonometric function.				90.9%
Solve equations involving inverse trigonometric functions.			100%	100%
▶ Solve applications and extensions.				63.6%
Section 7.2: The Inverse Trigonometric Functions (Continued)			85.4%	74%
Section 7.3: Trigonometric Equations			81.3%	74%
Section 7.4: Trigonometric Identities			56.3%	63.6%
Section 7.5: Sum and Difference Formulas			76.8%	79.2%
Section 7.6: Double-angle and Half-angle Formulas	94.5%	56.2%	70%	63.6%
Section 7.7: Product-to-Sum and Sum-to-Product Formulas	99.2%	90.9%	78.1%	74.2%
Ch. 8. Applications of Trigonometric Functions	95.6%		59.4%	76.9%
Ch. 12. Sequences; Induction; the Binomial Theorem	94.6%			29.5%
Ch. 13. Counting and Probability				
Ch. 14. A Preview of Calculus: The Limit, Derivative, and Integral of a Function				









### Conclusion

 The percentage of students earning A's and B's in their Math courses have increased since we introduced MyMathLab into our curriculum.

 Students are spending more time practicing mathematics this year than any previous years.  We anticipate that the success rate of those students in their subsequent course at their college will also increase.

 Teachers are tracking students' performance much better and providing more help for struggling students.  Teachers are interacting more with their students and are well aware of their strengths and weaknesses

### One student said,

"It is SO much more helpful that you can work and rework problems, select view an example or select help me solve it in MyMathLab. This method of learning has been the most successful method of learning in my entire education."