Course Student Learning Outcomes Assessment

MATH 160 Trigonometry

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General Information (Course Student Learning Outcomes Assessment)

Standing Requirements

Course Description

Angles and their measurement trigonometric functions and their application s including vector problems. Use of trigonometric identities. Graphing the basic functions and variations solving trigonometric equations. Graphing using polar coordinates and use of complex numbers.

Course Student Learning Outcomes

MATH 160 Trigonometry Outcome Set

Outcome

Outcome	Mapping
Outcome 1 Analyze, sketch and apply the six trigonometric functions and polar equations using such principles as aymptotic, periodic, and reciprocal behavior, as well as plotting points generated by a table or electronic device.	**Institutional Student Learning Outcomes:** Act 1, Act 3, Communicate 1, Communicate 2, Communicate 3, Learn 1, Learn 2, Think 1, Think 2
Outcome 2 Model, evaluate and solve equations and real-world problems using inverse functions, Law of Sines, Law of Cosines, technological tools, and algebraic techniques.	**Institutional Student Learning Outcomes:** Act 1, Act 3, Communicate 1, Communicate 2, Communicate 3, Learn 1, Learn 2, Think 1, Think 2, Think 3
Outcome 3 State, verify and apply trig identities, including but not limited to reciprocal, co-functional and Pythagorean identities, sum and difference identities, double- and half-angle identities.	**Institutional Student Learning Outcomes:** Act 1, Communicate 1, Communicate 3, Learn 1, Think 1, Think 2, Think 3

2014-2015 Assessment Cycle

Measurements

Outcomes and Measures

MATH 160 Trigonometry Outcome Set

Outcome

Outcome 1
Analyze, sketch and apply the six trigonometric functions and polar equations using such principles as aymptotic, periodic, and reciprocal behavior, as well as plotting points generated by a table or electronic device.

Measure: Math 160 SLO 1 - Fall 2014
Course level; Direct - Exam

Description of Measurement Tool: Students are given a departmental final with embedded questions (2 multiple-choice and 3 free-response) pertaining to specific topics for this SLO.

Multiple-choice questions are assessed as correct or incorrect. The free-response questions were broken down as follows:

Graphing the tangent function:
Correct shape and asymptote

Graphing the shifted sine/cosine function:
Correct amplitude, period, phase shift and graph.

Graphing the polar cardioid function:
Correct graph

Criteria for Success: Individual & Collective Student Criterion: Individually, success is defined as a student having correct answers for at least 4 out of the 5 embedded questions. Collectively, success is defined as 70% of the class being individually successful.

Cycle of Assessment: This outcome is assessed every three years.

For this report, the data was gathered in Fall 2014, collated, analyzed, reported, and discussed in Spring 2015, with recommendations implemented in Fall 2015.

Who is Responsible for Assessment Activity?: The Math 160 coordinator of record for 2014-2015, Anne Hauscarriague, is responsible for the assessment.

Findings

Finding per Measure

MATH 160 Trigonometry Outcome Set

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Who is Responsible for Assessment Activity?: The Math 160 coordinator of record for 2014-2015, Anne Hauscarriague, is responsible for the assessment.

Findings for Math 160 SLO 1 - Fall 2014

Summary of Findings: 5 questions were embedded into the final exam (listed below).

All final exams from 5 of the 5 sections were assessed. (n=121)

Student success rates per question:
1) Determine the trigonometric equation from the graph: 56%
2) Analyze and write the shifted trigonometric function as a single function: 62%
3) Sketch the tangent function (correct shape): 88%
4) Sketch the asymptotes for the tangent function: 55%
5) Identify the amplitude for the sine/cosine function: 97%
6) Determine the period for the sine/cosine function: 85%
7) Determine the phase shift for the sine/cosine function: 55%
8) Sketch the sine/cosine function, including correct phase shift: 45%
9) Graph the polar cardioid function: 78%

Overall: 69%

Results: Criteria for Success Achievement Status: Not Met

Analysis of Findings: Our results are just under the successful achievement status of 70%. There was a wide range of successful percentages (45%-97%). The biggest issue with graphing seems to be identifying the phase shift. However, identifying the general shape, amplitude, and period for tangent, sine and cosine and/or polar functions is satisfactory.

Recommendations: These results will be sent to current and past Math 160 instructors.
Encourage instructors to focus on identifying phase shifts for tangent, sine and cosine graphs.
Emphasize that leading coefficients must be factored out before phase shifts can be determined.
Discuss pacing of class to be sure teachers are not falling behind or feeling rushed.
Redesign final exam to be clearer on identifying all asymptotes for tangent functions, label axes for sine and cosine graphs, and identifying specific points for the polar cardioid graph.

This Findings is associated with the following Actions:

Math 160 SLO 1 Action Plan - Fall 2014
(Plans of Action; 2014-2015 Assessment Cycle)

Overall Recommendations

No text specified

Plans of Action

Actions

MATH 160 Trigonometry Outcome Set

Outcome

Outcome 1

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Action: Math 160 SLO 1 Action Plan - Fall 2014

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(Measurements and Findings; 2014-2015 Assessment Cycle)

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9) Graph the polar cardioid function: 78%

Overall: 69%

Details of Plan of Action: These results will be sent to all full-time and part-time math faculty, and will be discussed at our department meeting. The following will be addressed:

1) Encourage instructors to focus on identifying phase shifts for tangent, sine and cosine graphs. Emphasize that leading coefficients must be factored out before phase shifts can be determined.
2) Discuss pacing of class to be sure teachers are not falling behind or feeling rushed.
3) Form a committee during spring 2015 to help redesign the final exam to be clearer on identifying all asymptotes for tangent functions, label axes for sine and cosine graphs, and identifying specific points for the polar cardioid graph.

Plan of Action Timeline: Spring 2015: The Plan of Action will begin during the next scheduled faculty meeting after the assessment. Faculty meetings are once a month during Fall and Spring semesters.

Fall 2015 – Fall 2017: All faculty teaching Math 160 will be given reminders of the SLO results and the suggestions laid out in our Plan of Action at the beginning of each semester in their welcome packet.

Fall 2017: New Data will be collected to reassess this SLO.

Who is responsible for carrying out the Plan of Action?: The Math 160 coordinator of record for 2015-2018 will be responsible for the assessment.

How will you determine if the Plan of Action has been effective?: We will reassess this SLO in three years to determine if this Plan of Action was successful.

Additional Resources Required (if any):

Budget request amount: $0.00

Priority: Low

Status Reports

Action Statuses

MATH 160 Trigonometry Outcome Set

Outcome

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How will you determine if the Plan of Action has been effective?: We will reassess this SLO in three years to determine if this Plan of Action was successful.

Additional Resources Required (if any):

Budget request amount: $0.00

Priority: Low

Status for Math 160 SLO 1 Action Plan - Fall 2014

No Status Added

Status Summary

No text specified

Summary of Next Steps

No text specified

2013-2014 Assessment Cycle

Measurements

Outcomes and Measures

MATH 160 Trigonometry Outcome Set

Outcome

Outcome 3
State, verify and apply trig identities, including but not limited to reciprocal, co-functional and Pythagorean identities, sum and difference identities, double- and half-angle identities.

Measure: Math 160 SLO 3
Course level; Direct - Exam

Description of Measurement Tool: Students are given a departmental final with six embedded questions pertaining to specific topics for this SLO (five multiple choice and one free-response). There were evaluated from each course section.

Multiple choice questions are assessed as right or wrong and the free-response question is assessed on a 0-3 rubric scale:
3: Correct with appropriate trigonometric approach
2: Minor error or trigonometric approach
1: Attempted, but no appropriate trigonometry used
0: blank

Criteria for Success: Individual & Collective Student Criterion: Individually, success is correctly answering 3/4 of the multiple choice questions and earning a 2 or 3 on a 3-point rubric scale for the free-response question.

Collectively, success is defined as 70% of the class being individually successful.

Cycle of Assessment: This outcome will be assessed in the fall semester every three years.

For this report, the data was gathered in Fall 2013, collated, analyzed, reported, and discussed in Spring 2014, with recommendations implemented in Fall 2014.

Who is Responsible for Assessment Activity?: The Math 160 coordinator of record for 2013-2014, Anne Hauscarriague, is responsible for the assessment.

Findings

Finding per Measure

MATH 160 Trigonometry Outcome Set

Outcome

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Collectively, success is defined as 70% of the class being individually successful.

Cycle of Assessment: This outcome will be assessed in the fall semester every three years.

For this report, the data was gathered in Fall 2013, collated, analyzed, reported, and discussed in Spring 2014, with recommendations implemented in Fall 2014.

Who is Responsible for Assessment Activity?: The Math 160 coordinator of record for 2013-2014, Anne Hauscarriague, is responsible for the assessment.

Findings for Math 160 SLO 3

Summary of Findings: All students enrolled in all five sections were assessed. (n= 155)

Question 1 (Reciprocal ID): 66%
Question 2 (Reciprocal ID): 85%
Question 3 (Double angle): 57%
Question 4 (Sum/differ ID): 59%
Question 5 (Double angle): 44%
Question 6 (Sum/differ ID): 75%

Overall success: 64.3%

Results: Criteria for Success Achievement Status: Not Met

Analysis of Findings: While we would prefer to see a higher passing rate across all 6 questions, it is encouraging that reciprocal identities and sum and difference identities had an acceptable rate of success in one of the two questions analyzed.

Double angle identities had the lowest success rate.

Recommendations: The results should be shared with all math faculty.

Overall Recommendations

No text specified

Plans of Action

Actions

MATH 160 Trigonometry Outcome Set

Outcome

Outcome 3
State, verify and apply trig identities, including but not limited to reciprocal, co-functional and Pythagorean identities, sum and difference identities,

Action: Math 160 SLO 3

This Action is associated with the following Findings
No supporting Findings have been linked to this Action.

Details of Plan of Action: These assessment results will be shared with and discussed among

double- and half-angle identities.

past and current Math 160 instructors.

Encourage instructors to focus on double angle identities, especially as these are required in future course. The assessment tool may be modified to better ensure mastery throughout the semester.

Plan of Action Timeline: We will reassess this SLO in Fall of 2016.

Who is responsible for carrying out the Plan of Action?: The Math 160 coordinator(s) of record for 2016-2017 will be responsible for the assessment.

How will you determine if the Plan of Action has been effective?: This Plan of Action is considered successful if the overall success rate improves by 5 percentage points or more.

Additional Resources Required (if any):

Budget request amount: $0.00

Priority: Medium

Status Reports

Action Statuses

MATH 160 Trigonometry Outcome Set

Outcome

Outcome 3

State, verify and apply trig identities, including but not limited to reciprocal, co-functional and Pythagorean identities, sum and difference identities, double- and half-angle identities.

Action: Math 160 SLO 3

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Plan of Action Timeline: We will reassess this SLO in Fall of 2016.

Who is responsible for carrying out the Plan of Action?: The Math 160 coordinator(s) of record for 2016-2017 will be responsible for the assessment.

How will you determine if the Plan of Action has been effective?: This Plan of Action is considered successful if the overall success rate improves by 5 percentage points or more.

Additional Resources Required (if any):

Budget request amount: $0.00

Priority: Medium

Status for Math 160 SLO 3

No Status Added

Status Summary

No text specified

Summary of Next Steps

No text specified

2012-2013 Assessment Cycle

- **Measurements**
- **Findings**
- **Plans of Action**
- **Status Reports**