Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Mathematics
Academic Year of Report: 2018/19 (covering Summer 2017 through Spring 2019)
Date Submitted: November, 2019
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Report due 11/15/2019

A. **Brief Introductory Statement:**
Please review the Introductory Statement and contact information for your department or academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html** - if this information is current, please place an 'X' below. No further information is needed.

___ Information is current; no changes required.

Update if not current:

Contact Information
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B. Mission Statement
Please review the Mission Statement for your department or academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html** - if the mission statement is current, please place an 'X' below.; If the information is not current, please provide an update:

_x__ Information is current; no changes required.

Update if not current:

C. Student Learning Outcomes

Please review the Student Learning Outcomes for your academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html**. In particular, review in light of recent strategic reporting and indicate any needed updates. If the outcomes are current, mark below.

___ Information is current; no changes required.

Update if not current:

Learning Outcomes for the existing programs are the same, and we have a new program:

The B.S. in Mathematics with emphasis in Computational Statistics and Data Science has the following learning goals for students.

1. Students will understand the theoretical, conceptual, and applied underpinnings of Statistics.
2. Students will understand the theoretical, conceptual, and applied underpinnings of Data Science.
3. Students will demonstrate fundamentals and fluency in computation.
4. Students will effectively analyze and reason with data.
5. Students will be able to effectively communicate their results.

D-1. Curriculum
"A collection of courses is not a program. A curriculum has coherence, depth, and synthesis."
(Linda Suskie; presentation at NWCCU Assessment Fellowship, June 19, 2019)

Please review the Curriculum Grid for your department or academic program displayed on the assessment site:
http://www.weber.edu/portfolio/departments.html.

Indicate in the curriculum grid where graduating student performance is assessed for each program outcome. In the 'additional information' section, please provide information about these assessments (e.g., portfolios, presentations, projects, etc.) This information will be summarized at the college and institutional level for inclusion in our NWCCU reporting on student achievement.

Curriculum Map for Mathematics Major (Regular Emphasis)

	Department/Program Learning Outcomes Students who receive bachelor degrees in **Mathematics** at WSU are expected to have:			
Required Courses in Department/Program	Knowledge of and the ability to apply the concepts of differentiable, integral and multivariable calculus.	Knowledge of and ability to apply concepts of matrices and Euclidean vector space and/or ordinary differential equations.	Ability to comprehend and write proofs that are logically, grammatically and mathematically correct.	Knowledge of and ability to prove results in analysis and algebra.
Math 1210 Calculus I	1-3			
Math1220 Calculus II	1-3			
Math 2210 Calculus III	1-3			
Math 2270 Elementary Linear Algebra		1-3	1-2	
Math 2280 Ordinary Differential Equations	2-3	1-3		
Math 3110 Foundations of Algebra			1-3	
Math 4110 Modern Algebra I			2-3	1-3

Math 4120 Modern Algebra II or Math 4320 Topology			2-3	1-3
MATH 4210 Intro Real Analysis I			2-3	1-3
Math 4220 Intro Real Analysis II			2-3	1-3

Note[a]: Define words, letters or symbols used and their interpretation; i.e. 1= introduced, 2 = emphasized, 3 = mastered or
I = Introduced, E = Emphasized, U = Utilized, A = Assessed comprehensively;

Curriculum Map for Applied Math Major

	Department/Program Learning Outcomes Students who receive bachelor degrees in **Applied Mathematics** at WSU are expected to have:			
Required Courses in Department/Program	Knowledge of and the ability to apply the concepts of differentiable, integral and multivariable calculus.	Knowledge of and ability to apply concepts of matrices and Euclidean vector space and/or ordinary differential equations.	Knowledge and ability to apply the concepts of several areas of applied mathematics (prob. and stats, numerical analysis, partial differential equations, etc)	Ability to comprehend and write correct mathematical arguments
Math 1200 Mathematics Computer Laboratory	1-3		1-3	
Math 1210 Calculus I	1-3			
Math1220 Calculus II	1-3			
Math 2210 Calculus III	1-3			
Math 2270 Elementary Linear Algebra		1-3		1-3
Math 2280 Ordinary Differential Equations		1-3		
MATH 3410 Probability and Statistics I			1-3	

Math 3420 Probability and Statistics II			1-3	
Math 3550 Introduction to Mathematical Modeling			1-3	1-3
Math 3710 Boundary Value Problems or Math 3280 Dynamical Systems			1-3	
Math 3610 Graph Theory			1-3	1-3
Math 3810 Complex Variables			1-3	1-3
Math 4610 Numerical Analysis I			1-3	
Math 4620 Numerical Analysis II			1-3	
Math 4710 Partial Differential Equations			1-3	

Note[a]: Define words, letters or symbols used and their interpretation; i.e. 1= introduced, 2 = emphasized, 3 = mastered or
I = Introduced, E = Emphasized, U = Utilized, A = Assessed comprehensively;

Curriculum Map for Math Teaching Major

	Department/Program Learning Outcomes Students who receive bachelor degrees in **Mathematics Teaching** at WSU are expected to have:				
Required Courses in Department/Program	Knowledge of and the ability to apply the concepts of differentiable, integral and multivariable calculus.	Knowledge of and ability to apply concepts of matrices and Euclidean vector space and/or ordinary differential equations.	Ability to comprehend and write proofs that are logically, grammatically and mathematically correct.	Knowledge of basic probability and statistics, analysis, and number theory.	Knowledge of and ability to teach concepts of high school level mathematics
Math 1210 Calculus I	1-3				
Math1220 Calculus II	1-3				

Math 2210 Calculus III	1-3				
Math 2270 Elementary Linear Algebra		1-3			
Math 2280 Ordinary Differential Equations or Math 3550 Intro to Math Modeling		1-3			
Math 3110 Foundations of Algebra or Math 4110 Modern Algebra I			1-3		
MTHE 2210 Geometry from a Teaching Perspective			1-3		1-3
Math 3120 Foundations of Euclidean and non-Euclidean Geometry			2-3		
MATH 3160 Number Theory			1-3	1-3	
MATH 3410 Probability and Statistics I				1-3	
MATH 4210 Intro Real Analysis	2-3		2-3	1-3	
MTHE 3010 Methods and Technology for Teaching Secondary Math					1-3
MTHE 3060 Probability and Statistics from a Teaching Perspective				1-3	1-3
MTHE 4110 Algebra from a Teaching Perspective					1-3

Note[a]: Define words, letters or symbols used and their interpretation; i.e. 1= introduced, 2 = emphasized, 3 = mastered or I = Introduced, E = Emphasized, U = Utilized, A = Assessed comprehensively;

Curriculum Map for Computational Statistics and Data Science Major

Required Courses in Department/Program	Department/Program Learning Outcomes Students who receive bachelor degrees in **Computational Statistics and Data Science** at WSU are expected to have:				
	Students will understand the theoretical, conceptual, and applied underpinnings of Statistics	Students will understand the theoretical, conceptual, and applied underpinnings of Data Science	Students will demonstrate fundamentals and fluency in computation.	Students will effectively analyze and reason with data.	Students will be able to effectively communicate their results
Math 1210 Calculus I	1	1			
Math1220 Calculus II	1	1			
Math 2210 Calculus III	1	1			
Math 2270 Elementary Linear Algebra	1	1			
Math 3410 Probability and Statistics I	1-3	1		1	
Math 3420 Probability and Statistics II	2-3	1-2	1	2-3	1
Math 3450 Advanced Statistical Methods	1-3	2	1-3	2-3	1-3
Math 4400 Statistical Analysis of Big and Small Data	2-3	2-3	2-3	2-3	1-3

Note[a]: Define words, letters or symbols used and their interpretation; i.e. 1= introduced, 2 = emphasized, 3 = mastered or I = Introduced, E = Emphasized, U = Utilized, A = Assessed comprehensively;

D-2. High Impact Educational Experiences in the Curriculum

In response to the recent USHE requirement that all students have at least 1 HIEE in the first 30 credit hours and 1 HIEE in the major or minor we are asking programs to map HIEEs to curriculum using a traditional curriculum grid. This helps demonstrate how and where these goals are accomplished.

	Department/Program use of High Impact Educational Experiences **Mathematics Major**				
Courses	Proactive Advising	Write a paper	Presentation or present problems on the board	Practicing technical writing	Undergraduate Research
Within first 30 credits	x				
4120 Modern Algebra II		x	x	x	
4220 Intro Real Analysis II		x	x	x	
4110 Modern Algebra I				x	
4210 Intro Real Analysis I				x	
4910 Senior Research Project		x	x		x
2920 Mathematics Monday		x	x	x	x

Courses	Department/Program use of High Impact Educational Experiences **Applied Math Major**				
	Group Project	Presentation	Write paper	Individual Project	Problem Solving
3710 Boundary Value Problems	x	x			x
3550 Introduction to Mathematical Modeling	x	x	x		
4620 Math Numerical Analysis II		x	x	x	x
2920 Mathematics Monday	x	x	x	x	x
1200 Mathematics Computer Laboratory				x	x
Math 2920 Mathematics Monday	x	x	x	x	x

Courses	Department/Program use of High Impact Educational Experiences **Math Teaching Major**					
	Proactive Advising	Simulation of Teaching Practices	Observation and reflection in local schools	Writing lesson plans	Collaboration in Professional Learning Communities	Group Work and Problem Solving
Within first 30 credits	x					
MTHE 3010 Methods and Technology for Teaching Secondary Math		x	x	x	x	x
MTHE 4110 Algebra from a Teaching Perspective		x		x		
MTHE 3060 Probability and Statistics from a Teaching Perspective		x		x		
MTHE 2210 Geometry from a Teaching Perspective		x			x	
Math 2920 Mathematics Monday						x

Courses	Department/Program use of High Impact Educational Experiences **Computational Statistics and Data Science Major**				
	Case Study with Real Data	Understanding the world through data homework	Computer Simulation or Real Data Project	Signature Assignment	Group Work and Problem Solving
Math 3450 Advanced Statistical Methods	x	x			
Math 4400 Statistical Analysis of Big and Small Data		x	x		x
Math 3410/3420 Probability and Statistics I and II		x			x
Math 1040 Introduction to Statistics				x	
Math 2910 Mathematics Monday					x

HIEEs include capstone courses or experiences, community-engaged learning, evidence-based teaching practices, internships, project-based learning, study abroad/away, supplemental instruction, team-based learning, undergraduate research, pre-professional/career development experiences.

E. Assessment Plan

Please update the Assessment Plan for your department displayed on the assessment site: http://www.weber.edu/portfolio/departments.html. Keep in mind that reporting will be done biennially instead of annually; that should be reflected in your assessment plan. Please ensure that Gen Ed courses are assessed/reported at least twice during a standard program review cycle.

A complete plan will include a list of courses from which data will be gathered and the schedule, as well as an overview of the assessment strategy the department is using (for example, portfolios, or a combination of Chi assessment data and student survey information, or industry certification exams, etc.), and plans for continuous improvement.

Assessment plan is current on the assessment site.

F. Report of assessment results for the most previous academic year:

There are varieties of ways in which departments can choose to show evidence of learning. This is one example. The critical pieces to include are 1) learning outcome being assessed, 2) method(s) of measurement used, 3) threshold for 'acceptable – that is, the target performance, 4) actual results of the assessment, 5) interpretation/reflection on findings 6) the course of action to be taken based upon the interpretation, and 7) how that action will be evaluated.

A. Evidence of Learning: Courses within the Major

Course: Math 1210 Semester taught: Spring 2019 Sections included: Three sections were evaluated with a total of 75 students

Evidence of Learning: MATH 1210 Calculus I						
Measurable Learning Outcome Students will…	Method of Measurement*	Target Performance	Actual Performance	Interpretation of Findings	Action Plan/Use of Results	"Closing the Loop"
1. Use algebraic techniques to evaluate limits.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 65% or above	Measure 1: 73% of students scored 65% or above	Measure 1:The threshold is met.	Students usually perform lower on the final exam.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		

2. and 3. Find derivative of algebraic and trigonometric functions, defined explicitly or implicitly, using differentiation rules: power, product, quotient, and chain rules and implicit differentiation. Interpret derivative as the rate of change and use it to find equation of a tangent line, find velocity and acceleration, approximate value of a function, approximate a zero of a function or solve related rate problems.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 70% or above	Measure 1: 75% of students scored 70% or above	Measure 1: The threshold is met.		
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		
4.. Understand the role of first and second derivatives in the shape of graphs.	Measure 1: One question on the final exam	Measure 1: 70% of students will score 70% or above	Measure 1: 77% of students scored 70% or above	Measure 1: The threshold is met.		
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		
5. Solve optimization application problems.	Measure 1: The learning outcome was not evaluated on the final exam	Measure 1: Data could not be gathered.	Measure 1: Data was not gathered	Measure 1: Data was not gathered.		
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		
7. Interpret the definite integral as a sum and use it to find areas, volumes or the work done by a variable force.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 65% or above	Measure 1: 65% of students will score 65% or above	Measure 1: The threshold was not met.	Collect data from more sections and use more questions to evaluate the learning outcome.	

	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		
9. Understand important theorems such as Intermediate Value Theorem, Extreme value Theorem, Rolle's Theorem, Differential or Integral Mean Value Theorems, or Fundamental Theorem of Calculus.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 60% or above	Measure 1: 48% of students will score 60% or above	Measure 1: Only half of the students met the learning outcome.	Collect data from more sections and use more questions.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better)	Measure 2: 73% of students passed the course	Measure 2: The threshold is met.		

*Direct and indirect: at least one measure per objective must be a direct measure.

Course: Math 1220 Semester taught: Spring 2019 Sections included: Three sections were evaluated with a total of 91

Evidence of Learning: **MATH 1220Calculus II**

Measurable Learning Outcome Students will…	Method of Measurement*	Target Performance	Actual Performance	Interpretation of Findings	Action Plan/Use of Results	"Closing the Loop"
1. Evaluate limits using L'Hospital's Rule	Measure 1: Question on the final exam	Measure 1: 70% of students will score 65% or better	Measure 1: 47% of the students scored 65% or better	Measure 1: Only about half of the students were proficient. Improvement is necessary.	Next year, we will evaluate the outcome for more sections and we use more questions.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: The threshold is met, but we can do much better.	Include more sections in the assessment, to determine if action plan is needed.	
2. Find derivative of exponential, logarithmic, inverse trigonometric and inverse functions.	Measure 1: Question on the final exam	Measure 1: 70% of students will score 60% or above	Measure 1: 62% of students scored 70% or better	Measure 1: The threshold is not met.	Next year, we will evaluate the outcome for more sections and we use more questions.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: See the learning outcome 1.	See the learning outcome 1.	
3. Evaluate definite, indefinite, and improper integrals using integration techniques: integration by parts, trigonometric substitution, partial fractions and trigonometric identities.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 65% or better	Measure 1: 50% of students scored 65% or better	Measure 1: Only about half of the students met the threshold. More assessment is needed.	Include more sections in the assessment and look for a different measure.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: See the learning outcome 1.	See the learning outcome 1.	

Evidence of Learning: **MATH 1220 Calculus II**						
Measurable Learning Outcome Students will…	Method of Measurement*	Target Performance	Actual Performance	Interpretation of Findings	Action Plan/Use of Results	"Closing the Loop"
4. Use integrals to find arc length, surface area, pressure, center of mass or probability.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 70% or better	Measure 1: 80% of students scored 70% or better	Measure 1: Majority of students showed proficiency.	No action plan is needed.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: See the learning outcome 1.	See the learning outcome 1.	
6. Test for convergence of a series using an appropriate test: divergence, integral, comparison and limit comparison, ratio, root, or alternating series.	Measure 1: Two questions on the final exam	Measure 1: 70% of students will score 60% or better	Measure 1: 80% of students scored 60% or better	Measure 1: The threshold is met.	Evaluate more sections and see if the threshold could be raised.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: See the learning outcome 1.	See the learning outcome 1.	
7. Find the power series of functions, determine their radius and interval of convergence, and use differentiation, integration and combination to develop new power series or use them to estimate, integrate or find the limits.	Measure 1: Question on the final exam	Measure 1: 70% of students will score 60% or better	Measure 1: 63% of students scored 60% or better	Measure 1: The threshold is not met. Improve is needed.	Include more sections on the assessment and use more questions.	
	Measure 2: Course pass rate	Measure 2: 70% of students will pass the course (obtain grade C or better	Measure 2: 79% of students obtained grade C or better	Measure 2: See the learning outcome 1.	See the learning outcome 1.	

*Direct and indirect: at least one measure per objective must be a direct measure.
Additional narrative (optional – use as much space as needed):

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B. Evidence of Learning: General Education Courses

Course: Math 2020 Semester taught: Fall 2018 Sections included: CRN 23154

Evidence of Learning: **MATH 2020 Mathematics for Elementary Teachers II**						
Measurable Learning Outcome Students will…	Method of Measurement*	Target Performance	Actual Performance	Interpretation of Findings	Action Plan/Use of Results	"Closing the Loop"
1. Interpret mathematical models such as formulas, graphs, tables and schematics and draw inferences from them.	Measure 1: Three items (#10a, b, and c) on the final exam asking for the derivation for the formula of angles in a polygon, a 2D geometric shape, and a 3D geometric shape from a list of options.	Measure 1: 80% of the students will score 75% or better on the three items. (9 points total)	Measure 1: 63% of the students scored 75% or better on the three items. (16 out of 24 students scored 6.75 points or above)	Measure 1: The percent of students who were proficient on the items is okay, but improvement is necessary.	Include additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: 80% of the students pass with a C or better.	Measure 2: 92% of the students passed. (22 out of 24 students passed with 2 incompletes)	Measure 2: Most students successfully demonstrated proficiency in the course objectives.	No action plan needed at this time.	
2. Represent mathematical information symbolically, visually, numerically, and verbally.	Measure 1: Two items (#7a and b) on the final exam asking for the area and perimeter of a composite 2D figure given the diagram.	Measure 1: 80% of the students will score 75% or better on the two items. (9 points total)	Measure 1: 63% of the students scored 75% or better on the three items. (16 out of 24 students scored 6.75 points or above)	Measure 1: The percent of students who were proficient on the items is okay, but improvement is necessary.	Include additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		

3.Use arithmetical, algebraic, geometric, and statistical methods to solve problems.	Measure 1: One proof item (#5) on the final exam that uses geometric, algebraic, and arithmetical methods to solve it.	Measure 1: 80% of the students will score 75% or better on the item. (4 points total)	Measure 1: 50% of the students scored 75% or better on the item. (12 out of 24 students scored 3 points or above)	Measure 1: Half the students were proficient. Improvement is necessary.	Include additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives and select optimal results.	Measure 1: One item (#2) on the final exam that uses estimation and reasonableness of the length of objects using standard units.	Measure 1: 80% of the students will score 75% or better on the item. (5 points total)	Measure 1: 88% of the students scored 75% or better on the item. (21 out of 24 students scored 3.75 points or above)	Measure 1: We have met our threshold for this objective, but can do better.	Include additional items on the homework.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		
5. Recognize that mathematical and statistical methods have limits.	Measure 1: A set of questions on a homework assignment assessing the limits of mathematical methods to find the area of a rectangle.	Measure 1: 80% of the students will score 75% or better on the item. (10 points total)	Measure 1: 96% of the students scored 75% or better on the assignment. (23 out of 24 students scored 7.5 points or above)	Measure 1: The results were good, but might not be very accurate because the items were on a homework assignment and students could look up answers on the Internet.	Need to find better questions to assess this outcome on the final exam.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		

*Direct and indirect: at least one measure per objective must be a direct measure.

Course: Math 2020 Semester taught: Spring 2019 Sections included: CRNs 33413 and 33414

Evidence of Learning: **MATH 2020 Mathematics for Elementary Teachers II**						
Measurable Learning Outcome Students will…	Method of Measurement*	Target Performance	Actual Performance	Interpretation of Findings	Action Plan/Use of Results	"Closing the Loop"
1. Interpret mathematical models such as formulas, graphs, tables and schematics and draw inferences from them.	Measure 1: Three items (#10a, b, and c) on the final exam asking for the derivation for the formula of angles in a polygon, a 2D geometric shape, and a 3D geometric shape from a list of options.	Measure 1: 80% of the students will score 75% or better on the three items. (9 points total)	Measure 1: 80% of the students scored 75% or better on the assignment. (24 out of 30 students scored 6.75 points or above)	Measure 1: Goal was met!	Even though the goal was met this semester without implementing any changes, previous plan will be implemented which includes additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: 80% of the students pass with a C or better.	Measure 2: 93% of the students passed (28 out of 30 students passed.)	Measure 2: Most students successfully demonstrated proficiency in the course objectives.	No action plan needed at this time.	
2. Represent mathematical information symbolically, visually, numerically, and verbally.	Measure 1: Two items (#7a and b) on the final exam asking for the area and perimeter of a composite 2D figure given the diagram.	Measure 1: 80% of the students will score 75% or better on the two items. (9 points total)	Measure 1: 83% of the students scored 75% or better on the three items. (25 out of 30 students scored 6.75 points or above)	Measure 1:		Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		

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3.Use arithmetical, algebraic, geometric, and statistical methods to solve problems.	Measure 1: One proof item (#5) on the final exam that uses geometric, algebraic, and arithmetical methods to solve it.	Measure 1: 80% of the students will score 75% or better on the item. (4 points total)	Measure 1: 53% of the students scored 75% or better on the item. (16 out of 30 students scored 3 points or above)	Measure 1: Just over half the students were proficient. Improvement is still necessary.	Even though the goal was still not met this semester without implementing any changes, and performance is similar to the previous semester, the previous plan will be implemented which includes additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives and select optimal results.	Measure 1: One item (#2) on the final exam that uses estimation and reasonableness of the length of objects using standard units.	Measure 1: 80% of the students will score 75% or better on the item. (5 points total)	Measure 1: 80% of the students scored 75% or better on the item. (24 out of 30 students scored 3.75 points or above)	Measure 1: Goal was met!	Even though the goal was met this semester without implementing any changes, previous plan will be implemented which includes additional items on the homework and focus on these topics specifically on review day.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		
5. Recognize that mathematical and statistical methods have limits.	Measure 1: A set of questions on a homework assignment assessing the limits of mathematical methods to find the area of a rectangle.	Measure 1: 80% of the students will score 75% or better on the item. (10 points total)	Measure 1: 97% of the students scored 75% or better on the assignment. (26 out of 30 students scored 7.5 points or above)	Measure 1: The results were good, but might not be very accurate because the items were on a homework assignment and students could look up answers on the Internet.	Need to find better questions to assess this outcome on the final exam.	Conduct another "Evidence of Learning" assessment next year.
	Measure 2: Course pass rate	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]	Measure 2: [see Learning Outcome 1]		

Appendix A

Most departments or programs receive a number of recommendations from their Five/Seven-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is acting upon.

Date of Program Review: 2017/2018	Recommendation	Progress Description
Recommendation 1	Rewrite Mission Statement and Strategic Plan in order to find common goals and set priorities so that all faculty have a role in working together on re-evaluating and improving their mission.	Departmental respond was *Department Mission Statement and Strategic Plan were completely revised during the past three years.* We will also review the Mission Statement this year.
Recommendation 2	Hire more faculty.	The math department is in the process of hiring a Math Education Faculty, we still need a Math Faculty and a Statistician/Data Analyst. As it was stated in the departmental respond: *We believe increasing enrollments justify it and in addition to an increasing number of initiatives centered about math. These include an engineering calculus sequence request form EAST, QL taskforce initiative from the provost's office, concurrent math enrollment mandated by the Utah state congress, alternate placement testing – ALEKS, workshops for students to renew prerequisites, and presentations to help students change to a growth mindset.*
Recommendation 3	Hire an additional staff member.	Departmental respond was: *There is an additional staff person whose job it is to coordinate Concurrent Math Courses. The position is funded by grant money. Continuation is uncertain.*
Recommendation 4	Improve classroom space allocation.	Better classroom allocation is already in place. Larger courses are assigned into larger rooms and some courses with lower enrollment are assigned into smaller classrooms.

Recommendation 5	Assign course coordinators for multi-section courses	Course advisors has been assigned for all QL courses: Math 1030, Math 1040, Math 1050, Math 1080. For Calculus I and II we have a common final exam with one faculty coordinating it.

As stated in the departmental respond:
Additional narrative: To summarize, we will continue to follow through on the recommendations as best we can. Our overarching need is more faculty to address the needs in all the areas we serve, general education courses, service courses for STEM majors, courses for majors, pre and in service courses for teachers, community relations and training with the public schools, recruitment and retention of majors, and the formation of relations with the local employers in government and industry.

Appendix B

Please provide the following information about the full-time and adjunct faculty contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

Faculty Headcount	2017-18	2018-19
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)		
Full-time Tenured	12**	13**
Full-time Non-Tenured (includes tenure-track)	4*	3*
Part-time and adjunct	0	0
With Master's Degrees		
Full-time Tenured	0	0
Full-time Non-Tenured	1	1
Part-time and adjunct	6	6
With Bachelor's Degrees		
Full-time Tenured	0	0
Full-time Non-tenured	0	0
Part-time and adjunct	32	31
Other		
Full-time Tenured	0	0
Full-time Non-tenured (admins)	2	2
Part-time	0	0
Total Headcount Faculty		
Full-time Tenured	12	13
Full-time Non-tenured	5	4
Part-time	38	37

*Includes two faculty with split positions with CSME and ** one faculty on a ¾ FTE

Please respond to the following questions.

1) First year student success is critical to WSU's retention and graduation efforts. We are interested in finding out how departments support their first-year students. Do you have mechanisms and processes in place to identify, meet with, and support first-year students? Please provide a brief narrative focusing on your program's support of new students:

   a. Any first-year students taking courses in your program(s).

      Every semester all students enrolled in all QL courses, such as, Math 1030 Contemporary Math, Math 1040 Introduction to Statistics, Math 1050 College Algebra, Math 1080 Pre-Calculus, receive an email with information about math resources, for example Free Tutoring Center, and information on how to succeed in math courses. The email identifies eight ways to succeed in QL Math courses:

      1. Continue with your math courses every semester until finished (math prerequisite expire after two years).
      2. Take advantage of our free math tutoring recourses (link to more info is provided)
      3. Seek out your instructor during their student hours often for feedback (link to instructors' office hours)
      4. Form a study group with your classmates
      5. Homework, Homework, Homework! (You need to do math in order to succeed)
      6. Have a growth mindset. (Link is provided to see what your mindset is)
      7. Making mistakes is okay! That's how we learn.
      8. Lastly, attend your class regularly!

      The email also provides information on Quantitative Literacy Requirements and math pathways.

   b. Students declared in your program(s), whether or not they are taking courses in your program(s)

      All math major students are advised to meet with the math major advisor. The advisor helps students create a plan that helps them navigate through their degree.

      Every year, at the beginning of the fall semester, the math department together with the math club (Math Factor) host a fall social, where all math major students are invited to socialize with their peers and math professors. We usually have a good turn out and students enjoy the opportunity to meet with faculty and fellow students.

      At the beginning of each academic year, all math major students receive an e-mail with the following information:

      - Date and time of Math Welcome social
      - Reminder to make an appointment with Math Major Advisor

- Information about location of Math Major Study and Break Room
- Information about activities in the math department, such as Mathematics Mondays (a weekly event consisting of diverse mathematical ideas not typically covered in a single course, such as, puzzles and games, novel problems, journal articles, and talks by students, faculty and industry representatives)
- Scholarship information
- Information about math degrees (new programs, like Associate Degree or Data Science)
- Information about Departmental Honors

2) A key component of sound assessment practice is the process of 'closing the loop' – that is, following up on changes implemented as a response to your assessment findings, to determine the impact of those changes/innovations. It is also an aspect of assessment on which we need to improve, as suggested in our NWCCU mid-cycle report. Please describe the processes your program has in place to 'close the loop'.

As it is stated on the assessment site:

Internally, the Mathematics Department reviews its entire curriculum periodically, has dialogs with client departments, re-evaluates textbooks annually, keeps current on national curriculum trends, and studies course grade distributions from time to time. In addition, faculty share and review examinations, regularly collect student evaluations of teaching…. Faculty also consult with local school districts, graduate schools, and employers.

Glossary

Student Learning Outcomes/Measurable Learning Outcomes
The terms ‘learning outcome’, ‘learning objective’, ‘learning competency’, and ‘learning goal’ are often used interchangeably. Broadly, these terms reference what we want students to be able to do AFTER they pass a course or graduate from a program. For this document, we will use the word ‘outcomes’. Good learning outcomes are specific (but not too specific), are observable, and are clear. Good learning outcomes focus on skills: knowledge and understanding; transferrable skills; habits of mind; career skills; attitudes and values.

- Should be developed using action words (if you can see it, you can assess it).
- Use compound statements judiciously.
- Use complex statements judiciously.

Curriculum Grid
A chart identifying the key learning outcomes addressed in each of the curriculum’s key elements or learning experiences (Suskie, 2019). A good curriculum:

- Gives students ample, diverse opportunities to achieve core learning outcomes.
- Has appropriate, progressive rigor.
- Concludes with an integrative, synthesizing capstone experience.
- Is focused and simple.
- Uses research-informed strategies to help students learn and succeed.
- Is consistent across venues and modalities.
- Is greater than the sum of its parts.

Target Performance (previously referred to as ‘Threshold’)
The level of performance at which students are doing well enough to succeed in later studies (e.g., next course in sequence or next level of course) or career.

Actual Performance
How students performed on the specific assessment. An average score is less meaningful than a distribution of scores (for example, 72% of students met or exceeded the target performance, 5% of students failed the assessment).

Closing the Loop
The process of following up on changes made to curriculum, pedagogy, materials, etc., to determine if the changes had the desired impact.

Continuous Improvement

An idea with roots in manufacturing, that promotes the ongoing effort to improve. Continuous improvement uses data and evidence to improve student learning and drive student success.

Direct evidence

Evidence based upon actual student work; performance on a test, a presentation, or a research paper, for example. Direct evidence is tangible, visible, and measurable.

Indirect evidence

Evidence that serves as a proxy for student learning. May include student opinion/perception of learning, course grades, measures of satisfaction, participation. Works well as a complement to direct evidence.

HIEE – High Impact Educational Experiences

Promote student learning through curricular and co-curricular activities that are intentionally designed to foster active and integrative student engagement by utilizing multiple impact strategies.