Q-core Assessment Report
Course: M 283Q, Multivariable Calculus
Section assessed: M 283-001
Semester: Fall 2016
Instructor(s) and/or supervisor: Christina Hayes
Assessment done by (2 faculty members): Christina Hayes and Kim Nordby
Number of students in the course: 32
Number of students assessed (at least 6): 32
One section of M283Q was offered during the 2016-2017 academic year. All the students who took the final were sampled for the assessment.
Problems on the final exam were used to determine if the learning outcomes were demonstrated at an acceptable or unacceptable level. The description of the signature problem is listed below next to each learning outcome.

Learning Outcome 1: Interpret and draw inferences from mathematical or statistical models represented as formulas, graphs, or tables.
Problem 1 on the final exam. A plane and a point are given. Students are asked to find a plane parallel to the given plane that also contains the point.

- Total number of assignments assessed: 29
- Number of student assignments demonstrating the learning outcome at an acceptable level, as defined in the Q-core Rationale and Assessment Plan: 27
- Proportion of assignments rated as “acceptable”: 27/29
- Is this over the specified threshold of 2/3? Yes, 93% of the students were successful in giving a correct equation of the plane.
- Comments and ideas for improving the process of assessment: Students were assessed using their finals exams. The style of the final was that students were given a choice of problems to complete for points. Three of the 32 students chose not to complete the plane problem, which is why the number of students enrolled does not match the number of assignments assessed on this learning outcome. In the future, it may be simpler to identify which problems will be used for Q-core assessment and then require that each student taking the final complete those problems.

Learning Outcome 2: Represent mathematical or statistical information numerically and visually.
Problem 2 on the final exam. Students are asked to identify and sketch the graphs of various regions given in either rectangular, cylindrical or spherical coordinate systems.

- Total number of assignments assessed: 31
- Number of assignments demonstrating the learning outcome at an acceptable level, as defined in the Q-core Rationale and Assessment Plan: 28
- Proportion of assignments rated as “acceptable”: 28/31
• Is this over the specified threshold of 2/3? Yes, 90%

• Comments and ideas for better aligning the course or the assignments with the Q-core rationale: The course is most definitely aligned with the Q-core rational as almost all problems in multivariable calculus require relating representing mathematical problems visually or numerically. Students are generally able to visualize and then draw standard regions expressed as equations in cylindrical, spherical and cylindrical coordinate systems.

• Comments and ideas for improving the process of assessment:

Learning Outcome 3: Employ quantitative methods such as arithmetic, algebra, geometry, or statistical inference to solve problems

Problem 3 on the final exam. Students are a vector valued function representing position of a particle at time t and are then asked to find the velocity, speed and acceleration of the particle.

• Total number of assignments assessed: 33

• Number of assignments demonstrating the learning outcome at an acceptable level, as defined in the Q-core Rationale and Assessment Plan: 32

• Proportion of assignments rated as “acceptable”: 32/33

• Is this over the specified threshold of 2/3? Yes, 97%

• Comments and ideas for better aligning the course or the assignments with the Q-core rationale: Honors Multivariable Calculus is a course very much aligned with the Q-core rationale.