Several Variable Calculus, MATH 34

Chapter 9: I can use and interpret multivariable and vector functions.

☐ F.1 I can identify, evaluate and interpret functions of two variables using formulas, tables, graphs, and contour maps.

☐ F.2 I can compute dot products of vectors as well as use dot products to find lengths, angles, and projections. I can compute cross products of vectors and interpret them geometrically.

☐ F.3 I can find equations of lines and planes in space in various forms.

☐ F.4 I can draw curves in space and define vector-valued functions for space curves.

☐ F.5 I can evaluate and interpret derivatives and integrals of vector-valued functions.

☐ F.6 ** I can find arc length of space curves.

Chapter 10: I can calculate, use, and interpret partial derivatives.

☐ D.1 ** I can evaluate limits of functions of two variables.

☐ D.2 I can evaluate and interpret first-order partial derivatives of functions of two variables using formulas, tables, graphs, and contour maps.

☐ D.3 I can evaluate and interpret second-order partial derivatives of functions of two variables using formulas, tables, graphs, and contour maps.

☐ D.4 I can find equations of tangent planes for functions of two variables and use them to approximate function values.

☐ D.5 ** I can compute and interpret derivatives using various chain rules and the total derivative.

☐ D.6 I can evaluate and interpret directional derivatives and gradients of functions of multiple variables.

☐ D.7 I can find and classify critical points of functions of two variables.

Chapter 11: I can calculate, use, and interpret multiple integrals.

☐ I.1 I can define and interpret double integrals of functions of two variables over rectangles and numerically approximate them using double Riemann sums.

☐ I.2 I can set up and evaluate double integrals over general regions. I can interchange the order of integration.

☐ I.3 I can set up and evaluate double integrals in polar coordinates.

☐ I.4 I can find surface areas for parametrically defined surfaces.

☐ I.5 I can set up and evaluate triple integrals over general regions. I can interchange the order of integration.

☐ I.6 ** I can set up and evaluate triple integrals in spherical and cylindrical coordinates.

☐ I.7 ** I can make change of coordinates to double and triple integrals by changing bounds and finding the Jacobian.

☐ I.8 I can define, evaluate, and interpret line integrals of scalar functions on parametrized lines.

☐ I.9 I can define, evaluate, and interpret surface integrals of scalar functions across parametrized surfaces.

Chapter 12: I can calculate, use, and interpret vector calculus

☐ VC.1 I can identify, evaluate, sketch and interpret vector fields in the plane and in space.

☐ VC.2 I can define and interpret line integrals of vector fields along oriented curves. I can use parametrizations to evaluate line integrals of vector fields along oriented curves.

☐ VC.3 I can use the Fundamental Theorem of Calculus for Line Integrals to evaluate line integrals of gradient fields.

☐ VC.4 ** I can define, evaluate, and interpret the divergence of vector fields. I can define, evaluate, and interpret the curl of vector fields.

☐ VC.5 ** I can use Green's Theorem to evaluate circulations of smooth vector fields along simple closed curves in the plane.

☐ VC.6 ** I can define, evaluate, and interpret flux integrals of vector fields across parametrized surfaces.

☐ VC.7 ** I can use Stokes' Theorem to evaluate circulations of smooth vector fields along simple closed curves in space.

☐ VC.8 ** I can use The Divergence Theorem to evaluate flux of continuous vector fields through closed surfaces in space.