Outcomes List for Math 200-200935

Multivariable Calculus (8th edition of text)

Spring 2009-2010

The purpose of the Outcomes List is to give you a concrete summary of the material you should know, and the skills you should acquire, by the end of this course. As an overall summary, you should be able to, after completing this course:

- Do basic calculations with vectors and related geometric shapes (lines and planes), using dot products, cross products, and vector calculations
- Do calculus with space curves, including finding velocity and equations of tangent lines
- Work with plots of multivariable functions, including the computation of level curves and level surfaces
- Use partial derivatives, including chain rule formulas
- Compute tangent planes to surfaces, find critical points, and check for max/min
- Work with cylindrical and spherical coordinates
- Work with parametric surfaces
- Do basic multivariable integrals
- Do change of variables in multivariable integrals

This outcomes list will be updated with specific review problems and topics for each exam of the quarter.

The following information is for reviewing for the material of Exam 1:

Exam 1 will cover sections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6

12.1 Work with rectangular coordinates and work with equations of spheres, and "cylindrical surfaces", which are generalizations of regular cylinders.

In addition to reviewing assigned problems from 12.1, look at (all references to section 12.1):

Quick Check problem 4; Regular problems 16, 27, 49

12.2 Add vectors and do scalar multiplications. Compute lengths of vectors. Use vectors for basic geometry and force problems.

In addition to reviewing assigned problems from 12.2, look at (all references to section 12.2):
Example 8; Quick Check problem 4; Regular problems 23, 36

12.3  Compute a dot product, and use it to find the length of a vector. Use dot products to compute the angle between two vectors; in particular, how to check if two vectors are orthogonal. Compute the direction cosines of a vector. Decompose vectors into orthogonal components. Compute the orthogonal projection of one vector onto another.

In addition to reviewing assigned problems from 12.3, look at (all references to section 12.3):

Example 6; Quick Check problems 2, 4; Regular problems 4, 22

12.4  Compute a cross product, particularly using the determinant formula. Use a cross product to find a vector perpendicular to two given vectors. Use a cross product to find areas of parallelograms, and use a cross product together with a dot product to compute volumes of parallelepipeds.

In addition to reviewing assigned problems from 12.4, look at (all references to section 12.4):

Regular problems 12, 26, 30

12.5  Find the parametric equations of a line that satisfies certain conditions by finding a point on the line and a vector parallel to the line. Check if two lines in space are parallel, skew, or intersect.

In addition to reviewing assigned problems from 12.5, look at (all references to section 12.5):

Example 3; Quick Check problems 2, 4; Regular problems 13, 23, 43, 51

12.6  Find the equation of a plane that satisfies certain conditions by finding a point on the plane and a vector normal to the plane. Find the parametric equations of the line of intersection of two (non-parallel) planes. Find the (acute) angle of intersection between two planes.

In addition to reviewing assigned problems from 12.6, look at (all references to section 12.6):

Examples 6, 7; Regular problems 22, 25

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