

## MA 261 Exam 1 Study Guide

Exam 1 will cover material from lessons 1-8. This is chapters 12 and 13 in addition to sections 14.1 through 14.5 in the textbook.

Exam 1 will be worth 100 points. There are some multiple choice problems and some free response problems. There is no partial credit for multiple choice questions, but partial credit may be awarded for free response questions. You must show all of your work for full credit on the free response questions.

You should be able to do every homework question. Calculators are not allowed on the exam, so the computations will be simple enough to do by hand.

### **Terminology you should know (not an exhaustive list):**

- $\mathbb{R}^2, \mathbb{R}^3$ , coordinate planes, sphere, distance, vector, scalar, magnitude/length of a vector, dot product, cross product, right hand rule,  $\hat{i}, \hat{j}, \hat{k}$ , parallelogram, triangle, parallelepiped, orthogonal vectors, parallel vectors, angle between vectors
- Line, vector equation of a line, parametric equations of a line, symmetric equations of a line, direction numbers of a line, skew lines, parallel lines, plane, normal vector of a plane, cylinder, rulings, traces
- Vector function, space curve, derivative of a vector function, tangent vector to a space curve, arc length of a space curve, arc length function, parameterization of a vector function in terms of arc length, curvature, smooth curve, unit tangent vector, unit normal vector
- Position, displacement, average velocity, velocity, speed, acceleration
- Function of several variables, domain, range, level curves, contour plot
- Limit of a multivariate function, definition of continuity, partial derivative (and all of its notation), higher order partial derivatives, Clairaut's Theorem
- Tangent plane, linearization, differential, the chain rule, implicit differentiation

You should be able to do many things associated with this terminology as well.

As was said earlier, this is *not* an exhaustive list of material that could appear on the exam – it is only a list of the biggest ideas covered. You should be capable of doing every homework problem (even the ones which are too long and/or difficult to be placed on an exam – I can still ask you how to do parts of these problems, even if I don't ask you to do the full problem).

**Practice Problems you can do, if you want:**

Chapter 12 Review (pages 841-843)

Concept Check: #1-6, 8-13, 15, 16, 18

True-False Quiz: #1, 15-18

Exercises: #1-3, 4.a-h,k(but exact, do not round to nearest degree), 5, 6, 10, 11, 15-21, 23-25, 26.a,b,d, 28-31

Chapter 13 Review (pages 881-883)

Concept Check: #1(derivative only), 2, 3, 5, 6.a,b, 8a

True-False Quiz: #1-4, 7, 14

Exercises: #1b, 2.a,c, 3, 4(except graphing), 6.a,b, 8, 10, 11.a,b,d, 12, 17, 19

Chapter 14 Review (pages 981-984)

Concept Check: #1, 3, 4.a, 5.b,c, 6, 7.a, 8, 10, 11

True-False Quiz: #2, 5, 8

Exercises: #1, 2, 5-7, 9, 10, 13-24, 25-29(part a only), 31-37, 39, 40, 42