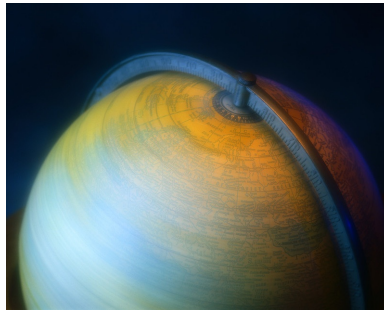


# Math 251 Quiz # 3 Review Sheet

This spinning globe

March 10, 2008



*Hi kids! It's a globe of the earth here, spinning in all sorts of directions, really excited to tell you more about multivariable calculus. Here are some helpful thoughts as you study for the quiz.*

1. Section 2.3: Partial derivatives. You were already examined on how to find partial derivatives last exam. Remember that this section also asks you to find the gradient of a real-valued function and determine the equation of the tangent plane to a surface at a given point.
2. Section 2.4: Intro to paths and curves. This section re-introduced parameterized curves (in the  $xy$ -plane) and generalized to what Corey called "space curves." I would know how to differentiate these curves, and to find the equations of tangent lines to these curves.
3. Section 2.5: Properties of the derivative. The only nontrivial property we discussed is the chain rule. That is, for a composition of multivariable functions,  $d(f \circ g) = (df)(dg)$ , the product of matrices, where we understand that into the Jacobian  $df$  of  $f$ , we plug in the output of  $g$ . Also, we saw, that from a certain perspective, this is exactly what happens in 1 dimension as well! I would know all applications of the chain rule discussed in class, and in your homework. In particular, there were 2 special applications which were of great use.

4. Section 2.6: Gradients and directional derivatives. We learned that the directional derivative is simply a dot product involving the gradient, and that the direction of fastest increase (on a surface) is in the (unit) gradient direction. We also found a great shortcut to finding equations of tangent planes by considering the fact that the gradient is normal to level surfaces. Yay!
5. Other info: ROCK ON!