[10-10-26-T12]

What to expect on exam 1

Note that this sheet is printed on both sides.

■ Definitions

You will be expected to state the definition of limit given at Varberg page 66.

You will be expected to state the definition of continuity given at Varberg page 86.

■ Theorems

You will be expected to state the *Intermediate Value Theorem* and possibly to illustrate it with a graph.

You will be expected to use the following theorems:

[2.6] Theorem A *Main Limit Theorem*.

[2.6] Theorem B *Substitution Theorem*.

[2.7] Theorem A *Limits of Trigonometric Functions*.

[2.7] Theorem B *Special Trigonometric Limits*.

[2.9] Theorems A, B, C, D, E.

[2.9] Theorem F *Intermediate Value Theorem*.

■ **Things to do**

You may be asked to do any or all of the following.

[1] Use the definition of the limit to prove (ϵ-δ proof) that a number is the limit of a function at a point. The proof will require bounding the "junk" factor. See example 5 page 69.

[2] Use the Main Limit Theorem to find the limits of a variety of functions.

[3] Use the special trigonometric limits ([2.7] Theorem B) to work problems similar to Example 2 in Section [2.7]

[4] Find limits of functions at infinity. This may be in the context of discovering a function's horizontal asymptotes. See Example 6 in Section [2.8].

[5] Find the limits of various functions for $x \longrightarrow \infty$. Remember that algebra is often required to rewrite the function in a form in which one might determine the limit at infinity. See [2.8] Example 2 and Example 3.

[6] Determine whether a function is continuous at a given point or on a given interval.

[7] Determine whether discontinuity is or is not removable.

[8] Repair a function that fails to be continuous at one or more points.

[9] Use the Intermediate Value Theorem to prove that a function attains a given value over a stated interval. Showing that a function has a root in a given interval is a question of this type where the value attained by the function happens to be zero.

[10] Identify (informally) points at which the limit of a function fails to exist, based on a visual inspection of a graph of the function. See Text [2.4] examples 5-7.