Topics on Exam 1

The exam covers Chapter 1.

(1) You will not be asked to produce a proof or derivation, except as noted below.

(2) Know and understand the formal definition of the limit that appears on page 66 of the text.

(3) Write a formal $(\delta - \varepsilon)$ proof that a function has a given limit at a given argument. Proof will not involve the "Junk factor".

(4) Use Main Limit Theorem (page 72) to find limits.

(5) Limits of trigonometric functions including special trigonometric limits on page 78.

(6) Find limits at infinity and **NO** (so-called infinite limits).

(7) Use limits at infinity to determine horizontal asymptotes.

(8) **NO** Use infinite limits to determine vertical asymptotes.

(9) Prove that a given line is an oblique asymptote of a given function. That is prove that for the function f and the line $ax+b$,

$$\lim_{x\to\infty}[f(x)-(ax+b)]=0 \quad \text{or} \quad \lim_{x\to-\infty}[f(x)-(ax+b)]=0$$

whichever is appropriate.

(10) Know the definitions for continuity at a point and on an interval.

(11) Know and understand Theorems A to F of section 2.9 about which functions are continuous and where.

(12) Identify points of discontinuity.

(13) "Repair" a removable discontinuity at c by saying how the function should be defined at c in order to be continuous there.

(14) Know and understand the Intermediate Value Theorem.

(15) Use the Intermediate Value Theorem to show that a given function has a root within a given inteval