The tests are cummulative and can include Pre-Calculus material mentioned in the MATH 2301 Calculus I handbook. This guide gives some sample questions for Sections 1.3, 1.4, and 1.5. In some cases part of the problem is deciding which method to use, so you may be able to do the problem using methods from earlier sections. Doing these problems does not replace doing homework problems.

1. Consider the function
$$f(x) = \begin{cases} x^2 & \text{if } x \leq -2 \\ Ax & \text{if } x > -2 \end{cases},$$
where A is some constant.
   (a) Find $\lim_{x \to -2^-} f(x)$. Is f continuous from the left at $x = -2$?
   (b) What value of A would make f continuous at $x = -2$?
   (c) Using the value of A that you just found, graph f.

2. Use the Intermediate Value Theorem to show that the equation $x^2 = \cos(x)$ has a solution.

3. Compute the following limits. If you use the squeeze theorem, then indicate the two functions that you are using to squeeze.
   (a) $\lim_{x \to 2} \dfrac{x-2}{x^2 - 5x + 6}$
   (b) $\lim_{x \to 1} \dfrac{\sqrt{x} - 1}{x - 1}$
   (c) $\lim_{x \to 0} x^2 \cos(3/x)$
   (d) $\lim_{h \to 0} \dfrac{x^2 - (x-2h)^2}{h}$
   (e) $\lim_{t \to 0} \dfrac{\frac{1}{5+t} - \frac{1}{5}}{t}$
   (f) For $f(x) = (2x+1)^{-1}$, compute $\lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h} =$

4. Sketch the graph of a single function f that:
   - has domain $[-4, 5]$
   - has $f(2) = 1$
   - has $\lim_{x \to 2} f(x) = 4$
   - has $\lim_{x \to 3^+} f(x) = -3$
   - has $\lim_{x \to 3^-} f(x) = 3$
   - is continuous except possibly at $x = 1$, $x = 2$, and $x = 3$

5. State the Intermediate Value Theorem. Identify what are its assumptions (hypotheses) and what are its conclusions.

6. State the Squeeze Theorem. Identify what are its assumptions (hypotheses) and what are its conclusions.