Math 142 - Midterm 3 Suggested Study Problems

Here are problems that are similar to the ones you might see on the exam.

Improper Integrals Cht. 8 review # 81, 85

Sequences Cht. 9 review # 3, 19

Geometric Series Cht. 9 review # 31, 33, 35, 37

Divergence Test Cht. 9 review # 40

p-Test Cht. 9 review # 45

Direct and Limit Comparison Tests Cht. 9 review # 49, 52, 54

Alternating Series Cht. 9 review # 55, 57, 59

Ratio Test Cht. 9 review # 61, 65, 66

Power Series Cht 9. review # 75, 77, 85

Taylor Polynomials Cht. 9 review # 69, 99

Here are some additional problems that are not from the book. **At least one of these questions will be on the test!**

1. Explain why Zeno's series $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots + \frac{1}{2^n} + \ldots$ converges.
2. What is the divergence test, and why doesn't it tell us that the harmonic series diverges?
3. Explain why Grandi's series $1 - 1 + 1 - 1 + \ldots + (-1)^n + \ldots$ diverges.
4. Does the alternating harmonic series converge absolutely or conditionally? As part of your answer, explain the difference between the two kinds of convergence.
5. Suppose that $p(n)$ and $q(n)$ are polynomials in n and $q(n)$ is never zero for any whole number n. What needs to be true about the degrees of $p(n)$ and $q(n)$ in order for $\sum_{n=0}^{\infty} \frac{p(n)}{q(n)}$ to converge? Explain your answer.

In addition to the questions above, make sure that you can recognize the three types of special series (geometric, alternating, and p-series) when you see them. Be sure that you know when these special series converge.