Please also go over revision guides 1 and 2.

1. Write down the terms of a sequence given either a closed formula, or a recurrence relation.
2. State carefully what it means for a sequence to be: increasing; decreasing; monotone; bounded above; bounded below; bounded; convergent; divergent; alternating. State the Monotone Convergence Theorem.
3. Can a sequence be both increasing and decreasing? If so, give an example; if not, explain why.
4. Given an sequence $a_0, a_1, a_2, a_3, \ldots$, how would you define its nth partial sum s_n? If you have a formula for the partial sums s_n, how would you recover the terms in the original sequence? How is the *infinite series* $a_0 + a_1 + a_2 + a_3 + \ldots$ defined? What does it mean for the series $\sum_{n=0}^{\infty} a_n$ to converge/diverge?
5. What is an arithmetic sequence? How would you find the nth term given the initial term a and the common difference d? How would you find the nth partial sum of an arithmetic sequence? Is it possible for an arithmetic sequence to give rise to a convergent infinite series?
6. What is a geometric sequence? How would you find the nth term given the initial term a and the common ratio r? How would you find the nth partial sum of an geometric sequence? For what values of r does the sequence of partial sums converge as n approaches ∞?
7. What is a p–series? For what values of p does the p–series converge? Does the harmonic series converge? What about the alternating harmonic series?
8. Use the following tests to determine whether a given series converges. State the conditions under which each test is valid.
   - Comparison test
   - Limit comparison test
   - Integral test
   - Absolute convergence test
   - Test for divergence
   - Alternating series test
   - Ratio test
   - Root test
9. Let $\sum_{n=0}^{\infty} c_n(x-a)^n$ be a power series centred at a. How would you find the radius of convergence for a power series? What is the interval of convergence?
10. Apply term-by-term differentiation or integration to a given power series to obtain a new power series. How does the interval of convergence of the new power series relate to that the original one?

11. What does it mean for a function $f(x) = \sum_{n=0}^{\infty} c_n(x-a)^n$ to have a power series representation for $|x-a| < R$? Assuming f does have a power series representation, how would you find the coefficients c_n (and thus, its Taylor expansion)?

12. What is a Taylor polynomial? Use Taylor polynomials to approximate a function, or to find approximate solutions to definite integrals. How would you estimate the error?