Questions to consider
Sect's 9.2, 10.1-10.4, 11.1-11.5,11.7
MA 2160, T. Olson

1. How do you recognize a sum as being a geometric series?
2. If a geometric series has only a finite number of terms, how can you find the sum?
3. If a geometric series has an infinite number of terms, how do you know if the sum converges? If the sum converges, how can you find the value?
4. Given a function $h(t)$, what is meant by its "Taylor polynomial of degree 5 centered at $t = 2$"? (How many terms are there in the polynomial? What does each term look like? How do you compute the coefficients?)
5. How is the tangent line approximation related to Taylor polynomials?
6. How/why would you use a Taylor polynomial centered at $x = 0$ to approximate a function depending on a small parameter? ... to interpret graphs when you zoom in?
7. What are the Taylor polynomials centered at $x = 0$ for $\frac{1}{1-x}$ and $\sin(x)$ and e^x? How could you find the Taylor polynomials centered at $x = 0$ for $\cos(x)$ from the one for $\sin(x)$?
8. How can you manipulate a Taylor polynomial to obtain another? Make up some examples.
9. What is the meaning of "interval of convergence" for a Taylor series?
10. What is the interval of convergence for the Taylor series for $\frac{1}{1+x}$? (How is this related to geometric series?)
11. If you know the Taylor approximation of degree 2 about $x = 3$, what does this tell you about the GRAPH of the function at/near $x = 3$? (Does it tell you anything about the function at the point $x = 0$?)
12. What is the formula for the "error bound" for Taylor polynomials (Where does the "M" come from?)? What does it mean?
13. How can you use the Taylor-error formula to bound the error on the interval $0 \leq x \leq 5$? ... to find an interval on which the error is less than .01?
14. What is a differential equation? What is meant by the "solution" to a differential equation?
15. How do you check whether or not a given function is a solution to a given differential equation?
16. Which kinds of differential equations can have slope fields? How is a slope field constructed and what does it mean? How is it related to solutions of the differential equation?
17. Which kinds of differential equations can be solved (approximately) by Euler's method? How is the approximate solution computed?
18. For Euler's method, what is the "step size" and how does it affect accuracy?
19. How is Euler's method related to slope fields?
20. How do you find a solution to a differential equation using separation of variables? How many independent arbitrary constants will be involved in the solution?
21. Given a differential equation, how can you tell if it can be solved by separation of variables?
22. If you need to find a solution to a differential equation going through a particular point, how do you tackle it? (What do you solve first, the differential equation or the extra condition?)
23. What is the differential equation for exponential growth? ... for exponential decay? ... for Newton's "law" of cooling? ... for the logistic model?
24. What is the meaning of "doubling time" or "half-life"? What are the differential equations (and their solutions) which have a "doubling time" or "half-life"?
25. What affects the values of the constants in each of the models listed above?
26. What is an "equilibrium solution" to a differential equation? How can you find an equilibrium solution for a first-order differential equation?
27. Using a slope field, how can you tell if an equilibrium solution is stable?
28. For Newton's "law" of cooling, what is the meaning of the horizontal asymptote in the solution? Where can you find this value in the original differential equation?
29. For the logistic equation, what is the meaning of the horizontal asymptote in the solution? Where can you find this value in the original differential equation?