Discovery Exercise for Differential Equations on a Computer

1. Go to `http://www.wolframalpha.com`.

2. Type the following:

$$\texttt{solve dy/dx = e\^{}x / sqrt(ky)}$$

3. Note that the program shows you your question, written in standard mathematical notation, so you can make sure it interpreted your question correctly. The program also gives you a solution. Test this solution to confirm that it solves the differential equation.

4. Type the following:

$$\texttt{solve dy/dx = y/(1-x\^{}3)}$$

5. Once again, the program gives you a solution. Perhaps you'd better take its word for this one.

6. Choose three other differential equations, ranging from easy ones that you know how to solve to more complicated ones that you don't. Record your questions and the solutions. If you try one that the computer can't solve just try a different one instead. If you get an answer that includes a function you've never heard of, that's fine. We'll discuss in the section below what to do with answers like that.