Euler 3

Teacher's Notes

With the calculator programs, a step size of .05 is usually pretty good to use on intervals such as [0, 6] or [0, 8]. It is small enough to give a decent graph but fast enough to keep moving. The graphs are created through the draw menu, so it is not possible to trace. Still, one can move the cursor around to get a sense of the scale. The final pair of coordinates will also give some sense of scale to help students make reasonable graphs.

For problem (3), step = .05 cannot be used on the TI 82-86 calculators since the step size must go into the length of the interval evenly. (This was intentional.) Remind them of problem (6) on R of C 4 which related sine and cosine.

Problem (4) may be extended. Consider the window [-5, 5] x [-5, 5]. Start with $y(-5) = -4$. The 3 in the numerator of the function is simply to help the view a bit in a reasonable window. Still, one can have a discussion about the shape of the resulting graph and what function this might be. In any case, this will provide more evidence for patterns and relationships between y and y'.

For the ending discussion, allow students to work a little on their own. Any patterns seen should be discussed with the entire class. Some students will not see much on their own, but they should be able to follow ideas or prompts given by others. The teacher should tie ideas together at this point.

Note that one can shown the y' approximation graph on the calculators. For example, enter $y_1 = 4 - x$ and $y_2 = y_1(\text{int}(x))$, referring to the greatest integer function. This will show the approximation with step size = 1. To see the approximation with stepsize = 1/2, enter $y_2 = y_1(\text{int}(2x)/2)$. Decreasing the step size more may help to show students how the approximating graph begins to appear more and more like the real y'. This might be best to do once for students as a demonstration. (Do not spend too much time on this.)