6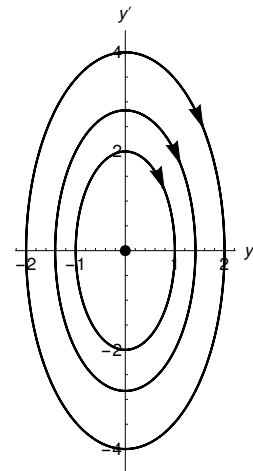. [13 points] Consider the phase portrait shown to the right, which shows the phase portrait for a linear, second-order, constant coefficient, homogeneous differential equation $L[y] = 0$.

    a. [7 points] Write a differential equation that could give this phase portrait. Explain how you obtain your solution, and why is it correct.

    b. [6 points] Suppose that we add a forcing term $f(t) = \cos(15t/8)$ to the equation, so that we are solving $L[y] = f(t)$. Sketch an approximate solution curve with $y(0) = 0$, $y'(0) = 1$. Explain why your solution appears as it does.