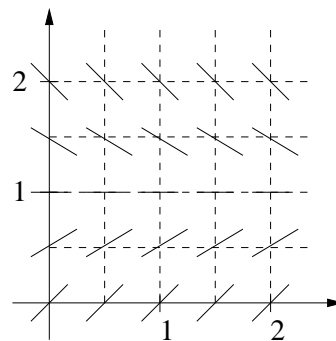**1.** Consider the differential equation $y'' + ky = 0$, where k is a constant. For what values of k, if any, is $y = e^{3x}$ a solution? (3 points)

2. Consider the slope field shown to the right. Let $y = f(x)$ be a solution to the corresponding differential equation that passes through the point $(0,2)$.
(a) Can $f(x) < 1$? Explain.
(b) If we use Euler's method with $\Delta x = 1.5$, can our approximation to y be less than 1? Explain.
(4 points)

3. Solve $tz\frac{dz}{dt} = 3t^2 + 4$. (3 points)