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 \( t^2 \frac{d^2z}{dt^2} = 3t^2 + 4 \). (3 points)