> The majority of the credit you receive will be based on the completeness and the clarity of your responses. Please use equal signs where appropriate and write solutions with a logical flow. Show your work, and avoid saying things that are untrue, ambiguous, or nonsensical.

1. Find a general solution to the given differential equations.

   (a) $y'' + 5y' + 6y = 0$

   (b) $y'' + 8y' + 16y = 0$

   (c) $y'' + 2y' + 5y = 0$

2. Solve the given initial value problem.

   (a) $y'' + 2y' - 8y = 0$, $y(0) = 3$, $y'(0) = -12$

   (b) $y'' + 2y' + y = 0$, $y(0) = 1$, $y'(0) = -3$

   (c) $y'' - 2y' + 2y = 0$, $y(\pi) = e^\pi$, $y'(\pi) = 0$