(1) (5 points) A certain city had a population of 20,000 in 1980 and a population of 25,000 in 1990. Assume that its population will continue to grow exponentially at a constant rate. What population can its city planners can expect in year 2000? (Do not simplify your answer!)
(1 point) any work.
(1 point) writing the equation or solution form \( P' = kP \) or \( P = P_0 e^{kt} \).
(1 point) finding \( k = \ln(25,000/20,000)/10 \).
(1 point) \( P(t) = 20,000 e^{\frac{\ln(25,000/20,000)}{10}} t \).
(1 point) \( P(20) = 20,000 e^{\frac{\ln(25,000/20,000)}{10} \cdot 20} \).
Note: Simplification is not requires, so if they make any mistake while trying to simplify, lets do not deduct any point!

(2) (5 points) Find a general solution of the differential equation, \( y' + 3y = 2xe^{-3x} \).
(1 point) any work.
(1 point) recognizing that it is linear.
(1 point) computing \( e^{\int 3dx} = e^{3x} \) and writing \( y'e^{3x} + 3ye^{3x} = 2xe^{-3x}e^{3x} \).
(1 point) \( (ye^{3x})' = \int 2xdx \).
(1 point) \( y = \frac{x^2 + C}{e^{3x}}. \)