1. 6 points Solve the differential equation \( \frac{dy}{dx} = x \sqrt{x} e^{y/2} \).

[You may leave the solution(s) in implicit form.]

2. 6 points Use Euler’s method to compute the first two approximations \( y_1 \) and \( y_2 \) to the initial value problem

\[ y' = x - 2xy, \quad y(1) = 3, \]

with step size \( dx = 0.25 \).
3. **8 points** Newton’s Law of Cooling asserts that the rate of change of the temperature of an object is proportional to the difference between the surrounding temperature and the object’s temperature.

A cold bottle of beer at $40^\circ F$ is placed into a warm room at $70^\circ F$. Ten minutes later, the temperature of the beer is $48^\circ F$. Use Newton’s Law of Cooling to find the temperature of the bottle of beer 25 minutes after the beer was placed into the room.

[You must show all your work.]