Velocity and Acceleration Models- HW Problems

1. A car's acceleration is proportional to the difference between 120mph and the car's velocity. It takes the car 10 seconds to accelerate from 0mph to 60mph. How long will it take the car to accelerate to 100mph?

2. A car is travelling at 50ft/sec and the engine shuts off. After 10 seconds the car is travelling at 25ft/sec. Suppose that the resistance is proportional to the velocity so that $\frac{dv}{dt} = -\rho v, \quad \rho > 0$. Find the velocity of the car, $v(t)$, and the distance travelled, $x(t)$, t seconds after the engine shuts off.

3. Solve problem number 2 where $\frac{dv}{dt} = -\rho v^2, \quad \rho > 0$.