1. Classify each of the following DEs as separable, exact, linear, homogeneous, or Bernoulli. Do not solve.
(a) \((2x + \tan y)\,dx - (y^2 - x\sec^2 y)\,dy = 0\)
(b) \((6y^3 - xy - y)\,dx + 2xdy = 0\)
(c) \((xy - 3x^2y)\,dx + e^{x-3y}dy = 0\)
(d) \((x\ln x - x\ln y)\,dx + 3(x - 2y)\,dy = 0\)

2. A radioactive substance decays at a rate proportional to the amount present \(P\). It was found that 20% of the substance disappears after 25 years. How long will it take for half the amount to disappear?