1. Classify each of the following DEs as separable, exact, linear, homogeneous, or Bernoulli. Do not solve.
   (a) $y(x + 2y^3) \, dx = 6x^2 \, dy$
   (b) $(\cos x \cos y - e^x \cot x) \, dx - \sin x \sin y \, dy = 0$
   (c) $(x^2 + \sin x) \, dx + (x^2 y^2 - 4x^2) \, dy = 0$
   (d) $(x \csc (y/x) - y) \, dx + 5x \, dy = 0$

2. In an experiment, a bacterial population, $P$ has rate of growth proportional to $P$ and is initially $P_0$. If the population has tripled after 2 hours, how long will it take it to be 10 times its initial value?