A particular disease can spread in one of four possible ways. Let P be the number of individuals infected at time t, $P(0) = P_o$, and the total population is 200. The four models are shown below.

Model A $\quad \dfrac{dP}{dt} = k$ $\qquad\qquad\qquad$ Model B $\quad \dfrac{dP}{dt} = kP$

Model C $\quad \dfrac{dP}{dt} = k(200 - P)$ $\qquad\qquad$ Model D $\quad \dfrac{dP}{dt} = kP(200 - P)$
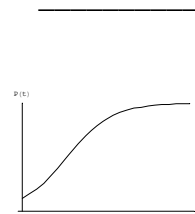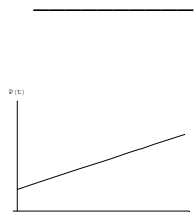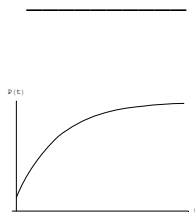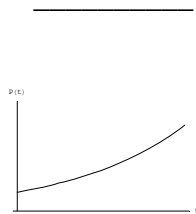
1. Match the model with its description:

_____The rate at which the population is infected is proportional to the number of individuals infected.

_____ The rate at which the population is infected is constant.

_____The rate at which the population is infected is proportional to the number of individuals infected and those that are not infected.

_____The rate at which the population is infected is proportional to the number of individuals not infected.

2. Match the model with its general solution:

_____ $\qquad\qquad$ _____ $\qquad\qquad$ _____ $\qquad\qquad$ _____

3. Match the model with its general solution:

_____ $\qquad\qquad$ _____ $\qquad\qquad$ _____ $\qquad\qquad$ _____

$P = 200 - (200 - P_o)e^{-kt}$ $\qquad$ $P = P_o e^{kt}$ $\qquad\qquad$ $P = \dfrac{200 P_o}{P_o + (200 - P_o)e^{-kt}}$ $\qquad\qquad$ $P = kt + P_o$