Math 345A HW #2

February 17, 2015

1. Section 2.1: 6,8,24,26,38,39
2. In section 2.1 #39, we saw a simple population model given by $dP/dt = kP - h$ where $P(t)$ is the population at time t. The constants h, k are assumed to be positive. We saw that an equilibrium solution was when $P = h/k$. Moreover, if $P(0) = P_0$ was greater than h/k, the population grew unbounded. Moreover, if $P_0 < h/k$, it decreased without bound. Can you adjust the model with some additional hypothesis about population carrying capacity such that if $P_0 > h/k$ it reaches some carrying capacity as $t \to \infty$. Moreover, can you also adjust it so that if $P_0 < h/k$, the population will decrease to 0 as $t \to \infty$.
3. Section 2.2: 8,9,14,17,18,22,25,28,30,32,38,44,49,46,52
4. Section 2.3: 12,14,18,24,26,34,35,40,42,52 (Note: #52 is a mathematical modeling problem)
5. Section 2.4: 12,15,19,24,26,30,32,34,35,38,39,44