MATH 315, Fall 2024
Assignment 23

Due: Monday, December 9

1.   For the original Blumstein-Larson Model, find each of the following conditional probabilities in terms of the parameters p_A, p_I. p_{R1}, p_{R2} and p_{R3}:

    (a)   *Pr(C | A)* = Probability that a person who has just been

       arrested will commit at least one more crime

    (b)   *Pr(A | C)*

    (c)   *Pr(C | I)*

    (d)   *Pr(I | A)*

2.   We investigated the Blumstein-Larson Model with $p_{R1} = p_{R2} = p_{R3}$. Suppose that arrest and imprisonment have an effect on the propensity to commit new crimes so that $p_{R1} = 2\, p_{R2} = 4\, p_{R3}$.

    With $p = p_{R3}$ and $p_A = p_I = 1/4$, determine *Pr(C | C)*, *Pr(A | A)* and *Pr(I | I)*. Compare these recidivism measures by plotting them against *p*.

3.   Assume again that $p_{R1} = p_{R2} = p_{R3} = p$.

    (a) Under what conditions will *Pr(C | C) = Pr(A | A) = Pr(I | I)*?

    (b) If $p_A = p_I = 1/4$ and the prison warden reports a recidivism measure of .1,

    what recidivism rates will be reported by the police officer and the person on the

street?

    (c) Determine all 3 recidivism measures if

        (1) $p_A = p_I = 1/2$

        (2) $p_A = p_I = 1/3$

        (3) $p_A = 1/3$ and $p_I = 2/3$