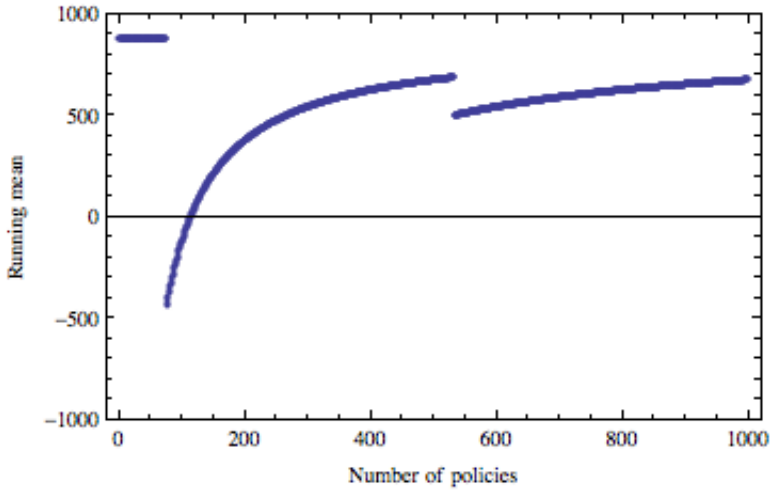
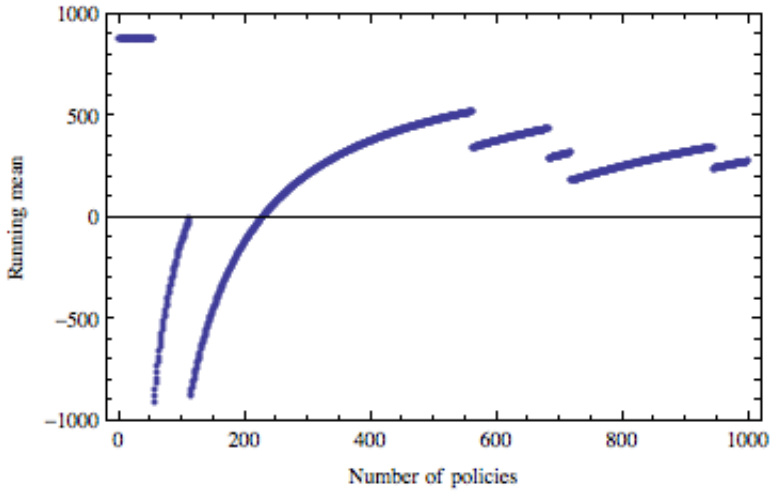
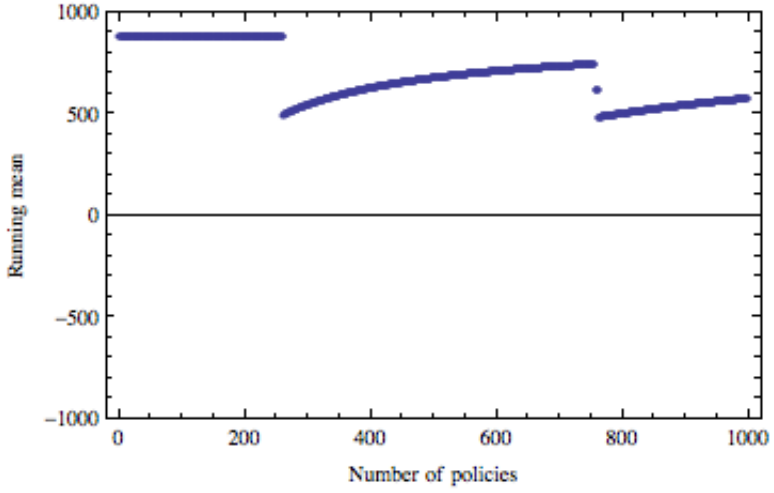
Simulations for Problem 4.89

The plots below are generating by simulating the scenario described in Problem 4.89. The horizontal axis gives the number of policies considered. The vertical axis gives the running mean for the profit per policy. The first four plots show simulations for 1000 policies.

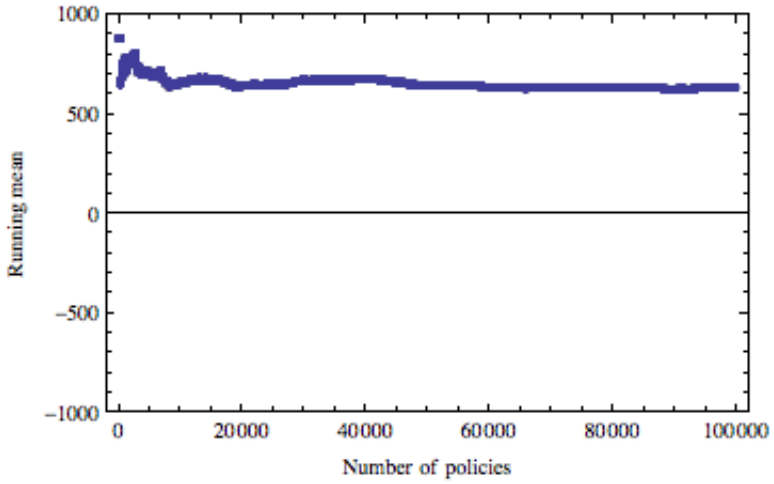


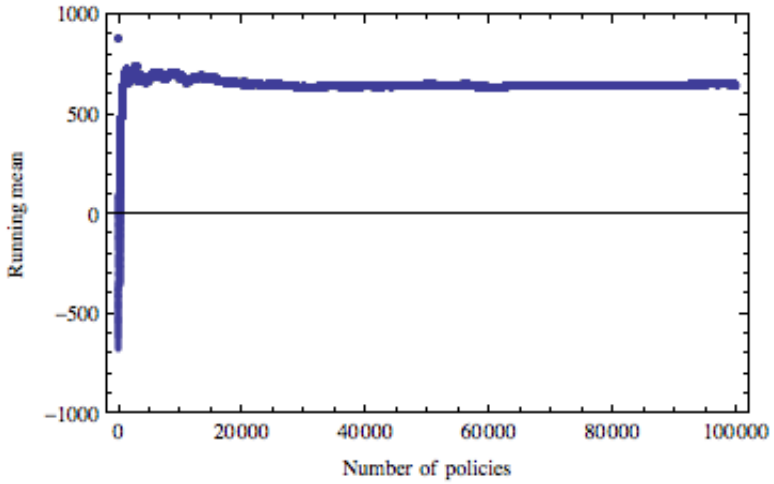




Notice that, in each of these cases, the profit per policy is positive when all 1000 policies are considered. In class, we saw this to be true for many other cases and never saw a case of simulating 1000 policies for which the profit per policy was negative at the end.

The next two plots show simulations for 100,000 policies.





In both of these cases, the profit per policy settles down to something a litte over \$600 when all 100,000 policies are considered. The calculation you do for this problem reveals that the random variable mean is \$623.22. The two simulations here are consistent with the law of large numbers which guarantees that the running mean will get close, and stay close, to this mean of \$623.22 as the number of policies considered increases.