1. Derive the following asymptotic moments associated with $m_3(x)$: mean, variance, first order autocorrelation. Furthermore, compute $\nabla_b g(b_0)$.Which moments are informative for estimating b?
2. Simulate a series of "true" data of length $T = 200$ using (1). We will use this to compute $M_T(x)$.
3. Set H = 10 and simulate H vectors of length T = 200 random variables e_t from $N(0, 1)$. We will use this to compute $M_{TH}(y(b))$. Store these vectors. You will use the same vector of random variables throughout the entire exercise. Since this exercise requires you to estimate σ^2, you want to change the variance of e_t during the estimation. You can simply use σ_{e_t} when the variance is σ^2.
4.
5. Next we estimating the $l = 2$ vector b for the just identified case where m_2 uses the variance and autocorrelation. Given what you found in part (1), do you now think there will be a problem? If not, hopefully the standard error of the estimate of b as well as the J test will tell us something. Let's see. For this case, perform steps (a)-(d) above.
6. Next, we will consider the overidentified case where m3 uses the mean, variance and autocorrelation. Let's see. For this case, perform steps (a)-(d) above. Furthermore, bootstrap the the finite sample distribution of the estimators using the following algorithm:
   i. Draw ϵ_t and e_t^h from $N(0, 1)$ for $t = 1, 2, \ldots, T$ and $h = 1, 2, \ldots, H$. Compute $(\hat{b}_{TH}^1), \hat{b}_{TH}^2$ as described.
   ii. Repeat (e) using another seed.