STAT 315 Chapter 6 Review Questions

1. Match the following symbols to the definition

μ	An unbiased estimator for the population mean
$\hat{\mu}$	Any point estimator for the population variance
s^2	Any point estimator for the population mean
$\widehat{\sigma^2}$	The population mean
$\bar{X}$	The population variance
σ^2	An unbiased estimator for the population variance

2. Assume X_i are iid samples from a population with mean μ and variance σ^2. For each of the following estimators for μ, (1) determine the bias (if there is bias), and (2) find their variance.

$\hat{\mu}_1 = \frac{X_1 + X_2 + X_3 + X_4}{4}$

$\hat{\mu}_2 = \frac{X_1 + X_2 + X_3}{3}$

$\hat{\mu}_3 = \sum_{i=1}^{10} \frac{X_i}{2^i}$

$\hat{\mu}_4 = \sum_{i=1}^{\infty} \frac{X_i}{2^i}$ (hint: this is a geometric series)

3. Which of the above estimators would you prefer (consider bias and variance)? Is this practical?