Point estimation.

1. *Let X_1, X_2, X_3, X_4, X_5 be independent random variables each having uniform distribution on the interval $[0, \theta]$. Consider the following estimators on the unknown parameter θ :*

$\hat{\theta}_1 = 2\bar{X}; \ \hat{\theta}_2 = X_{(5)}; \ \hat{\theta}_3 = \frac{6}{5}X_{(5)}; \ \hat{\theta}_4 = 2X_{(3)}.$

Which of the above estimators are unbiased? Which has the smallest variance?

2. *Estimate parameters of the following distributions using the method of moments:*

(a) $N(\mu, \sigma^2)$.
(b) $\Gamma(\alpha, \beta)$;
(c) $Uni(a, b)$.
(d) $Bernoulli(p)$.

3. *Find the MLE for the following distributions:*
(a) $N(\mu, \sigma^2)$.
(b) $Exp(\lambda)$.
(c) $Uni(a, b)$.
(d) $Bernoulli(p)$.