

STAT 341 - Worksheet
1/23/2019

Your Name (scribe): _____

Partner Name(s): _____

1. Suppose you have a population distribution defined on $[a, b]$ with $a < \theta < b$.

a. Sketch a sampling distribution that has $MSE = 0$.

b. Sketch a sampling distribution that has $Var = 0$ and $MSE > 0$.

c. Sketch a sampling distribution that has $Bias = 0$ and $MSE > 0$.

d. Sketch a sampling distribution that has $Bias > 0$ and $Var > 0$.

e. Sketch a sampling distribution that has the maximum variance possible on $[a, b]$.

2. Let Y_1, \dots, Y_n be a random sample of size n from the pdf

$$f_Y(y; \theta) = \frac{1}{\theta} e^{-y/\theta} I\{y > 0\}.$$

a. Find the distribution of $W \equiv nY_{\min}$.

b. Is this an unbiased estimator of θ ?

c. What is the variance of W ? Compare this to the variance of \bar{Y} .

3. Assume that heights (in inches) across the student body at UW are distributed $N(\mu=69, \sigma^2=9)$. Suppose you took a random sample of size $n=5$ students from this population.
- Approximate the probability that the tallest person in your sample is no taller than 6'6" (an expression is fine).
 - Approximate the probability that the shortest person in your sample is less than 5'6" (an expression is fine).