Stat 446 Homework #2 Due: Wednesday, September 9, 2015.

For problem 1, fill in this page and submit it with your homework solution. For the other problems, attach your answers to this sheet. No credit will be given without this sheet.

1. Use the information given in Exercise 1, page 61 to answer the following.

   (a) (2pt) What are the values of t, $\overline{y}_U$, and S^2 for this population? Note: The "Sample, $\mathcal{S}$" column contains the unit labels, and not the y-values.

   (b) (4pt) For each possible sample from both sampling plans, determine the values of $\overline{y}_{\mathcal{S}}$, s^2, $\overline{y}_{\mathcal{S}}$, and s^2. Fill in the following tables with your values.

Plan 1

$\mathcal{S}$	y-values	$P(\mathcal{S})$	$\overline{y}_{\mathcal{S}}$	$s^2_{\mathcal{S}}$	$\overline{y}_{\mathcal{S}}P(\mathcal{S})$	$s^2_{\mathcal{S}}P(\mathcal{S})$
$\mathcal{S}_1$		1/8				
$\mathcal{S}_2$		1/8				
$\mathcal{S}_3$		1/8				
$\mathcal{S}_4$		1/8				
$\mathcal{S}_5$		1/8				
$\mathcal{S}_6$		1/8				
$\mathcal{S}_7$		1/8				
$\mathcal{S}_8$		1/8				

Plan 2

$\mathcal{S}$	y-values	$P(\mathcal{S})$	$\overline{y}_{\mathcal{S}}$	$s^2_{\mathcal{S}}$	$\overline{y}_{\mathcal{S}}P(\mathcal{S})$	$s^2_{\mathcal{S}}P(\mathcal{S})$
$\mathcal{S}_1$		1/4				
$\mathcal{S}_2$		1/2				
$\mathcal{S}_3$		1/4				

   (c) (2pt) For each sampling plan, what are the values of $E[\overline{y}]$ and $E[s^2]$?

	$E[\overline{y}]$	$E[s^2]$
Plan 1		
Plan 2		

(d) (2pt) For each sampling plan, what are the values of Bias$[\overline{y}]$ and Bias$[s^2]$?

	Bias$(\overline{y})$	Bias(s^2)
Plan 1		
Plan 2		

(e) (1pt) For Plan 2, find π_i for each unit.

$\pi_1 =$	$\pi_2 =$	$\pi_3 =$	$\pi_4 =$	$\pi_5 =$

2. Use the information given in Exercise 2, page 62 (which refers to Example 2 on page 29 of the text) to answer the following.

   (a) (1.5pt) Exercise 2, part (a) (page 62).

   (b) (1pt) Exercise 2, part (b) (page 62). You will need to calculate $\widehat{t} = 8\overline{y}$ for each of the 5 samples.

   (c) (1pt) Calculate $E(\widehat{t})$.

   (d) (.5pt) Is $\widehat{t}$ an unbiased estimator of the true population total t?
   If no, then what is the value of the bias?

3. (3pt) Exercise 21, parts (a) and (e) (pages 65-66). Note: you do not need the random number file to answer these.

4. (4pt) **Stat Graduate Students only**: Exercise 21, parts (b) and (f) (pages 65-66).