

## Lesson 2: The Statistical Process & Design of Studies

### Preparation

### Solutions

Please note that the steps show rounded numbers, but that the final answers to the problems are calculated without rounding.

Problem	Part	Solution
1	A	Design the Study - State a research question, what needs to be done to answer the research question. What is the population? What kind of data needs to be collected?
1	B	Collect Data - How is the sample collected, and going out to actually obtain the data?
1	C	Describe the Data - Creating graphs or calculating statistics to help visualize and describe the data.
1	D	Make Inferences - Using the information contained in a sample to draw conclusions about a population.
1	E	Take Action - Determine which action to take based on the results of the study.
2	A	c- Simple Random Sample (SRS)
2	B	a - Stratified Sampling
2	C	b - Systematic Sampling
2	D	d - Cluster Sampling
3	-	Experiment - Researchers control the conditions under which measurements are made.
		Observational Study - Researchers simply observe what happens without controlling the conditions under which measurements are made.
		Treatment - The new or experimental condition that is imposed on the subjects.
		Response Variable - The variable that changes or responds to the treatment.
		Subjects - Participants in a study
4	-	The Null Hypothesis ( $H_0$ ) is the foundational assumption about the population, the 'status quo'
		The Alternative Hypothesis ( $H_a$ ) is the statement of what is true if the null hypothesis is rejected. It is also a statement about the population.
5	-	P-Value: The probability that a result will be observed that is as extreme or more extreme than the information observed, assuming that the null hypothesis is true.
6	A	Convenience Sampling
6	B	Systematic Sampling
6	C	Simple Random Sampling
6	D	Stratified Sampling

Problem	Part	Solution
6	E	Cluster Sampling
7	A	Cluster Sampling
7	B	Simple Random Sampling
7	C	Stratified Sampling
7	D	Systematic Sampling
8	A	Observational Study
8	B	Experimental Design
		Response Variable - Hours of sleep they get in a week
		Treatment - Sleepzeze or placebo
		Subjects - 1,000 insomnia patients
9	A	Designed Experiment
9	B	224 patients diagnosed with skin irritations
9	C	The degree of skin irritations observed in the patients
9	D	0.5% cream, 1% cream, and placebo