

1. (5 points) The _____ of a statistic describes the values of the statistic in all possible samples of the same size from the same population.

- A. sampling distribution
- B. standard deviation
- C. central limit theorem

2. (5 points) The National Assessment of Educational Progress (NAEP) includes a mathematics test for high school seniors. Scores on the test range from 0 to 300. Suppose that you give the NAEP test to an SRS of 900 12th-graders from a large population in which the scores have mean $\mu = 150$ and standard deviation $\sigma = 35$. The mean \bar{x} will vary if you take repeated samples.

- A. 150 ± 2.29
- B. 2.29
- C. 148 ± 2.29

3. (5 points) In the experiment of the [violence and sex in television programs exercise](#), the 336 subjects are labeled 001 to 336. Labels are selected at random by software, with the first 84 selected assigned to view TV show 1, the next 84 to view TV show 2, and the next 84 to view TV show 3. The 84 remaining subjects view TV show 4. This is a

- A. completely randomized design
- B. matched pairs design because the subjects are matched to the TV shows.
- C. block design with TV shows representing the four blocks

4. (5 points) Archaeologists plan to examine a sample of two-meter-square plots near an ancient Greek city for artifacts visible in the ground. They choose separate samples of plots from floodplain, coast, foothills, and high hills. What kind of sample is this?

- A. A simple random sample
- B. A voluntary response sample
- C. A stratified random sample

5. (20 points) The freshman class at The Ohio State University contains 6168 students. The Office of International Affairs is considering increasing its programming staff for its study abroad program and is going to sample the entering freshman class to see how many students are considering taking advantage of the opportunity to travel abroad while attending Ohio State.

(a) How would you label the names in order to select an SRS?

(b) Use Table B starting at line 135 to select an SRS of 8 Ohio State freshmen.

6. (20 points) A class survey in a large class for first-year college students asked, About how many minutes do you study on a typical weeknight? The mean response of the 463 students was $\bar{x} = 118$ minutes. Suppose that we know that the study time follows a Normal distribution with standard deviation $\sigma = 65$ minutes in the population of all first-year students at this university.

(a) Use the survey result to give a 99% confidence interval for the mean study time of all first-year students.

(b) What condition not yet mentioned must be met for your confidence interval to be valid?

7. (20 points) Choose at random a person aged 15 to 44 years. Ask their age and who they live with (alone, with spouse, with other persons). Here is the probability model for 12 possible answers:

	age 15-19	age 20-24	age 25-34	age 35-44
Alone	0.001	0.011	0.031	0.030
With Spouse	0.001	0.023	0.155	0.216
With Others	0.169	0.132	0.142	0.089

(a) List the outcomes that make up the event

$$A = \{\text{The person chosen is either 15 to 19 years old or lives with others, or both}\}$$

(b) What is $P(A)$? Explain carefully why $P(A)$ is not the sum of the probabilities

$$P(\text{The person chosen is either 15 to 19 years old})$$

and

$$P(\text{Lives with others}).$$

8. (20 points) In a study of exercise, a large group of male runners walk on a treadmill for 6 minutes. After this exercise, their heart rates vary with mean 8.8 beats per five seconds and standard deviation 1.0 beats per five seconds. This distribution takes only whole-number values, so it is certainly not Normal.

(a) Let \bar{x} be the mean number of beats per five seconds after measuring heart rate for 12 five-second intervals (a minute). What is the approximate distribution of \bar{x} according to the central limit theorem?

(b) What is the approximate probability that \bar{x} is less than 8?

(c) What is the approximate probability that the heart rate of a runner is less than 100 beats per minute? (Hint: Restate this event in terms of \bar{x} .)