

Introductory Concepts WS

DIRECTIONS: **SHOW ALL WORK!!**

A final response following a calculation should be a sentence. Place a box around your final response.

Round probability calculations to 4 decimal places.

Round other numerical results including percents to two decimal places (e.g. 2.56 shoes, 18.49%).

1. Twerk Pharmaceutical is testing a new drug that it believes lowers the total cholesterol for men over the age of 50. The researchers randomly assigned a sample of 120 men to one of two groups. One group would receive the new drug and the other a placebo. After six months, the average counts for the two groups would be compared to see if the drug is effective. The subjects' weights, ages, smoking status (current, former, never), and level of physical activity (sedentary, light, moderate, frequent) were also considered in the data. Below are the counts for 30 men in the experimental group after the six-month trial.

167	183	197	191	170	171
174	182	190	181	208	178
195	200	182	184	172	166
175	184	169	167	181	165
167	203	188	208	179	210

- (a) Identify an individual, the population, and the sample for this study.
- (b) Identify all variables measured in this study. Categorize each as qualitative, discrete, or continuous.
- (c) What is the parameter of interest for the researchers? What is the statistic?
- (d) Is this investigation an observational study or a designed experiment? Justify your response.
- (e) Use technology to construct a frequency histogram for the data. What shape best describes the distribution?
2. Below is a contingency table for the smoking statuses and activity levels for 20 men in the study.

Smoke?	Activity Level				TOTAL
	Sedentary	Light	Moderate	Frequent	
Never	4	3	2	2	11
Former	2	1	3	1	7
Current	1	0	1	0	2
TOTAL	7	4	6	3	20

- (a) Construct a relative frequency bar chart for smoking status.
- (b) What percent of the men are former smokers who exercise moderately?
- (c) What percent of former smokers exercise moderately?
- (d) What percent of males who exercise moderately are former smokers?
3. Identify the type of sampling used in each exercise. Your choices are simple random sample (SRS), stratified random sample (StRS), cluster sample (CS), systematic random sample (SyRS), or convenience sample (CON).
- (a) In order to determine the average IQ of ninth-grade students, a school psychologist obtains a list of all high schools in the local public school system. She randomly selects five of these schools and administers an IQ test to all ninth-graders at the selected schools.
- (b) Julia, gathering data for her psychology project, interviewed 50 students on the campus quad. She asked their opinions about safe spaces on campus and their impact on free speech.
- (c) A member of Congress wishes to determine her constituency's opinion regarding estate taxes. She divides her constituency into three income classes: low, middle, and upper. She then takes a random sample of households from each income class.
- (d) In an effort to identify whether an advertising campaign has been effective, a marketing firm conducts a nationwide poll by randomly selecting 1000 individuals from a list of known users of the product.
- (e) A farmer divides his orchard into 50 subsections, randomly selects 4 and samples all trees within the 4 subsections in order to approximate the yield of his orchard.
- (f) A school official divides the student population into five classes: freshman, sophomore, junior, senior, and graduate. The official takes a random sample from each class and asks the students' opinions regarding student services.

- (g) A lobby has a list of the 100 senators of the United States. In order to determine the Senate's position regarding farm subsidies, they decide to talk with every seventh senator on the list starting with the fourth.
- (h) A station manager reviews the online poll from his morning show to gauge fan's interest in a new segment which aired that morning.