

Question 1 (1 point)

A random sample of 100 parents with young children in Winnipeg is asked whether they have taken their children to see the Manitoba Children's Museum. What is the population of interest in this survey?

Question 1 options:

- A) the 100 parents who responded to the survey
- B) all young children in Winnipeg
- C) all young children in Winnipeg who have been to the Manitoba Children's Museum
- D) the parents of young children in Winnipeg
- E) the parents of young children in Winnipeg who have taken their children to see the Manitoba Children's Museum

Question 2 (1.5 points)

Which of the following statements are true of a table of random digits? (Select all that apply.)

Question 2 options:

- The digits 0000 are just as likely to appear as the digits 2847.
- Immediately after observing the three digits 656, it is more likely the next set will be 220 instead of 656.
- The digits 77777 can never appear as a group because the pattern is not random.

Question 3 (2 points)

A teacher is travelling to Europe for her summer holidays, but she won't have enough time to visit all the countries she would like to see. She estimates that she will have enough time to visit six countries. She makes a list of all the countries she would like to visit. They are numbered and shown below:

01 – <i>Austria</i>	11 – <i>Hungary</i>	21 – <i>Romania</i>
02 – <i>Belgium</i>	12 – <i>Iceland</i>	22 – <i>Slovakia</i>
03 – <i>Bulgaria</i>	13 – <i>Ireland</i>	23 – <i>Spain</i>
04 – <i>Croatia</i>	14 – <i>Italy</i>	24 – <i>Sweden</i>
05 – <i>Czech Republic</i>	15 – <i>Latvia</i>	25 – <i>Switzerland</i>
06 – <i>Denmark</i>	16 – <i>Moldova</i>	26 – <i>Turkey</i>
07 – <i>Finland</i>	17 – <i>Netherlands</i>	27 – <i>Ukraine</i>
08 – <i>France</i>	18 – <i>Norway</i>	28 – <i>United Kingdom</i>
09 – <i>Germany</i>	19 – <i>Poland</i>	
10 – <i>Greece</i>	20 – <i>Portugal</i>	

You will use the string of random digits below (starting at the left) to select a simple random sample of six countries for the teacher to visit:

29581046375119256043861042273602195315223764089045

Which is the last (sixth) country selected into the sample?

Question 3 options:

- A) Slovakia
- B) Latvia
- C) Poland
- D) France
- E) Belgium

Question 4 (2.5 points)

A polling firm is interested in Canadian voters' intentions prior to a federal election. Match the five proposed sampling schemes on the left with the six types of sample that are obtained on the right.

Question 4 options:

- | | |
|---|------------------------------|
| A random sample of five major Canadian cities is selected. Within each selected city, random samples of neighbourhoods are selected and all residents in the selected neighbourhoods are contacted. | 1. Voluntary response sample |
| From a list of all Canadian voters, 500 are randomly selected and contacted. | 2. Convenience sample |
| Representatives from the polling firm select the first 50 voting-eligible adults they encounter at major public areas in each of the major Canadian cities. | 3. Simple random sample |
| Random samples of 50 voters are contacted from each of the 13 provinces and territories. | 4. Stratified random sample |
| In each of the major Canadian cities, the polling firm places an ad on the most popular radio station with a phone number to call to participate in the survey. | 5. Multistage random sample |
| | 6. Census |

Question 5 (1.5 points)

Consider the below situations. Match each situation on the left with the type of bias present on the right.

Question 5 options:

- | | |
|--|-----------------------|
| Jim phoned a number he saw on the 6:00 news to respond to a survey question. | 1. Voluntary response |
| Matthew had no chance of being included in the phone survey because he doesn't have a phone. | 2. Undercoverage |
| Natalie hung up the phone when she heard the person calling was from a polling firm. | 3. Nonresponse |

Question 6 (1 point)

Records of a sample of arrests revealed that there was a strong positive correlation between the number of police officers who responded to the scene of a crime, and the jail time later received by the criminal. Does this mean that more police officers arriving at a crime scene **causes** a criminal's jail time to increase? Of course not! Which of the following is an obvious lurking variable in this case?

Question 6 options:

- A) neighbourhood where the crime occurred
- B) time of day the crime occurred
- C) seriousness of the crime
- D) age of the criminal
- E) all of the above

Question 7 (1 point)

A golfer bought new clubs this year to try to improve his game. His scores were lower this summer than last summer at all three golf courses he played. This is an example of:

Question 7 options:

- A) an experiment with a control
- B) a completely randomized design
- C) a randomized block design with three blocks
- D) a matched pairs design
- E) an observational study

Information

Questions 8 and 9 refer to the following:

A researcher wants to compare the effectiveness of 3 different diets, 2 different types of exercise, and 2 different exercise frequencies.

Question 8 (1 point)

How many treatments are involved in this experiment?

Your Answer:

Question 9 (0.5 points)

If the researcher decides to use 5 subjects for each treatment, then what is the total number of subjects required for the experiment?

Your Answer:

Question 10 (1 point)

Pine trees that grow in the dry forests of Arizona may be better able to resist drought if they can grow in the shade. An experiment will be carried out to examine the effects of light and water on the growth of pine trees. Pine seedlings will be planted in a greenhouse. They will be planted in either full light or reduced light, and will either be watered once a week, or given no water. All treatments will be randomly assigned to an equal number of seedlings. The growth of the trees will be measured after one year. Experimenters are examining two different types of pine tree (Ponderosa and Apache). They believe the response of the two types of pine tree to the various treatments may differ, so they conduct the experiment separately for the two types. What are the factor levels in this experiment?

Question 10 options:

- amount of light and amount of water
- amount of light, amount of water and type of pine tree
- full light, reduced light, watered once a week, no water
- full light, reduced light, watered once a week, no water, Ponderosa, Apache
- full light/watered once a week, full light/no water, reduced light/watered once a week, reduced light/no water

Question 11 (1 point)

A scientist is conducting an experiment to compare the effects of four treatments, and 180 university students have volunteered to participate. 60 volunteers are from the Department of Biology, 60 are from the Department of Chemistry and 60 are from the Department of Physics. The scientist believes that students' responses may differ, depending on their area of study, so she decides to use a randomized block design. She should use:

Question 11 options:

- four blocks, each consisting of 15 Biology students, 15 Chemistry students and 15 Physics students.
- four blocks, consisting of 45 students randomly assigned to each block.
- 60 blocks, each consisting of one Biology student, one Chemistry student and one Physics student.
- three blocks, one with all 60 Biology students, one with all 60 Chemistry students and one with all 60 Physics students.
- three blocks, each consisting of 20 Biology students, 20 Chemistry students and 20 Physics students.

Question 12 (0.5 points)

True or False: A matched pairs design is a special type of randomized block design used for comparing two treatments.

Question 12 options:

- A) True
- B) False

Question 13 (0.5 points)

True or False: Randomization is used in a matched pairs design to place individuals into pairs.

Question 13 options:

- A) True
- B) False

Question 14 (0.5 points)

True or False: In a matched pairs design, the two individuals within a pair should receive the same treatment in order to make a fair comparison.

Question 14 options:

- A) True
- B) False