Answer the following questions:

1. Sometimes it is better to ask all of the population before making a decision. For each scenario, state whether a **sample** should be used or a **census**.
    a) Testing the quality of the air in airplanes.
    b) Determining the popularity of a particular website.
    c) Determining the number of potential buyers of a new MP3 player.
    d) Determining the chemical composition of a good barbeque sauce.
    e) Checking the air pressure of the tires on a car.
    f) Determining the effectiveness of a new laser-eye surgery.

2. Write the Roman numeral of the term beside its definition.

    I. statistics   II. population   III. random sampling   IV. stratified sampling

    a) Any member of this population has an equal chance of being selected.   _____
    b) Collected, organized, analysed numerical information   _____
    c) Population is divided into groups with similarities.   _____
    d) Entire group   _____

3. Identify the following samples as random or stratified.

a) People sitting in seats whose seat numbers are evenly divisible by 10 (i.e., 10, 20, 30, etc.) at a baseball game are selected to complete a questionnaire on the services provided by the ballpark.	
b) Students at college are surveyed according to year of study (first year, second year, etc.) to determine their choice of automobile preference.	
c) Pet owners are organized into groups by the type of their pets (i.e., dog owners, cat owners, fish owners, etc.) and surveyed about their preference of pet food.	
d) At a conference, people were given a card from a standard deck of 52 cards. They were then organized into four groups by the suit on the card. Each of the four groups completed a different survey	

4. Given the following four options, which would be most effective in predicting the outcome of the upcoming municipal election for mayor, and why?
    a) 100 completed surveys that were handed out randomly through the city.
    b) 100 phone calls made to different parts of the city.
    c) 100 people interviewed at a local neighbourhood-watch party.
    d) 100 surveys completed by children at a local middle school.

5. To obtain an accurate picture of the district of York, a surveyor needs to use a stratified sample to represent each town fairly. How many from each town (populations shown below) should be surveyed if a total of 500 people can be surveyed?

Town	Population
Markham	208 615
Vaughan	182 022
Richmond Hill	132 030
Newmarket	65 788
Aurora	40 167
Georgina	39 263
Whitchurch-Stouffville	22 008
East Gwillimbury	20 555
King Township	18 533

6. A school board received a load of 10 000 graphing calculators to pass out to their high schools. They were concerned with the state of the delivery and therefore with the number of defective calculators. They decided to check them out.

   First, 20 calculators were checked and all worked perfectly.
   Second, 100 calculators were tested and 2 were broken.
   Third, 1000 were tested and 15 were broken.

   a) After the first test, would it be fair to say that none of the calculators were broken? Why or why not?
   b) Whose statement is likely more accurate?
         Sami: 2% are defective   Sima: 1.5% are defective
   c) In the shipment of 10 000, how many would you estimate to be defective? Explain

7. A local high school has 600 students in grade 9, 400 in grade 10, 300 in grade 11 and 200 in grade 12. A sample of 100 students is used to choose which brand of chocolate bar should be sold in the vending machine. How many of the 100 surveys should be handed out to
   a) Grade 10s?
   b) Grade 11s?
   c) What type of sample is this?

8. For each scenario, state whether a stratified sample should be used. Explain your reasoning.
   a) Canada wants to hold a general referendum to decide a major political issue. A sample of 10 000 people is chosen to predict the outcome.
   b) A shipment of 35 000 clear plastic rulers is to be checked for defects.
   c) There are 250 women and 750 men working at Harpo studios. A sample of 20 is taken to determine what type of end-of year party should be planned.
   d) The director of a local community centre is supposed to decide if any of her budget should be spent on pool maintenance.
   e) At a Tai Chi club, an opinion poll is to be conducted on the quality of the equipment.

9. For each of the following samples, the cluster technique was used. Which would result in a fair sample (F) and which would result in a poor sample (P)?
   a) Asking ER-nurses about the value of a new triage approach.
   b) Going to a high school to determine the most popular brand of jeans.
   c) Asking only senior students about the prom location.
   d) Asking Smart-Car owners about a hot environmental issue.

10. The owners of a home improvement company want to increase their business in a community. Discuss how they could use each sampling method to survey the community.

    Random sample:

    Stratified sample:

Be prepared to discuss the following questions:
A. Some surveyors are not too concerned about the sample group and use the most convenient group. Discuss the problems with this approach to surveying.

B. In the question above, discuss how the survey can also be used as a marketing or advertising tool.
C. A company wants to learn about the environmental awareness of a community. Discuss how the company should choose a sample to conduct a survey.
D. People whose phone numbers end with the number 9 were called to complete a phone survey. Discuss whether this is a good technique to create a random sample.
E. In another survey, people whose social insurance numbers begin with the number 4 were asked to complete a survey. Discuss whether this is a good technique to create a random sample.
F. In order to find out which songs are the most popular downloads, a survey was sent out to a number of teenagers.
   a) What are some advantages of using a survey to collect data?
   b) What are some disadvantages to this method?
   c) What would be another way to get this same information?
G. Gelman's Rent-All want to see if they should open up a second shop at a neighbouring plaza. They conduct a poll by leaving sheets at the entrance of the plaza and asking people to fill them in.
   a) What type of sample is this?
   b) What are some of the pros of this method?