Edexcel Collecting and interpreting data

Section 1: Collecting data

Exercise level 2

1. In the UK National Lottery, players choose six numbers from 1 to 59. There is a Lucky Dip option which allows the player to have six numbers chosen at random.
   (i) The population being sampled from is the numbers 1 to 59. What is the population mean?
   (ii) A particular Lucky Dip selection consists of the numbers
   $$1, 5, 8, 11, 15, 18.$$
   (A) What is the sample mean?
   (B) Is this sample biased? Give a reason for your answer.

2. A researcher wants to find out what people who live in a particular town think about the local recycling facilities. Each of the following methods of taking a sample is biased. For each one, explain why it is biased.
   (i) Ring people chosen at random from the telephone directory for the town.
   (ii) Put an advert in the local paper asking for volunteers and choose at random from the volunteers.
   (iii) Choose all people who come out of the local supermarket between 9am and 10am on a Monday.

3. The NHAMCS survey collects information from a large random sample of hospital records for visits to emergency departments in the United States. The survey shows that 15.9% of such visits are by patients aged 65 and over. Four possible conclusions based on this information are given below. For each conclusion, decide whether it is justified and give a reason for your answer.
   (i) About 16% of the population of the United States is aged 65 and over.
   (ii) About 16% of all visits to hospital emergency departments in the United States are made by people aged 65 and over.
   (iii) About 16% of all visits to hospital emergency departments in the UK are made by people aged 65 and over.
   (iv) About 8% of all visits to hospital emergency departments in the United States are made by females aged 65 and over.

4. An inspector is responsible for inspecting the care homes for the elderly in a particular area. There are 500 care homes in the area. The inspector can inspect one care home each day. She has the right to visit any care home in the area without giving notice of her visit. For each of the following methods of deciding which care homes to visit, give one advantage and one disadvantage of the method.
   (i) List the care homes in alphabetical order and visit them in that order, one each day.
   (ii) Each morning, choose a care home at random to visit.
   (iii) If there have been complaints about any care home, visit it as soon as possible. On days when there are no care homes with complaints to visit, choose a care home at random from those which have not been inspected in the past year.