MARKS

4

(2, 2)

1. Bicycle riding has become more popular; is it also getting safer? In the U.S. during 1988, 24,800,000 people rode a bicycle at least six times and 949 people were killed in bicycle accidents. In 1992, there were 54,632,000 riders and 903 bicycle fatalities.
   (a) Calculate and compare the death rates in the two years; comment briefly.
   (b) Although the data come from the *same* government publication, we suspect that some change in the measuring system took place between 1988 and 1992 that makes the data for the two years not directly comparable. Explain briefly why we should be suspicious.

(a) The death rates are: 1988: $\frac{949}{24.8} \simeq 38.3$ per million;

1992: $\frac{903}{54.632} \simeq 16.5$ per million.

Answer: the rate is lower in 1992, by a factor of about 2.3.

38.3 per million (a)
1988 death rate

16.5 per million (a)
1992 death rate

(b) We should be suspicious because the data indicate a *substantial decrease* in the death rate over a relatively *short* time period (4 years), when there were no *major* changes involving bicycle safety.

A clue to the matter may be the *definition* of bicycle riding – *at least 6 times* in 1988, only *riders* in 1992; this is a *measuring* issue.

MARKS

5

(3, 2)

2. You want to compare the 'size' of several statistics textbooks.
   (a) Give three (3) possible numerical variates that make precise the vague idea of the 'size' of a book; for each variate, give the *units* of measurement and the *measuring instrument* required.
   (b) Explain briefly which variate is most appropriate for estimating how long it would take you to read the book; for deciding whether it would fit into your bag.

	Variate	Units	Measuring instrument
(a) (1)	Height or width or thickness	cm	Ruler
(a) (2)	Weight	grams	Balance or scale
(a) (3)	Number of pages, words or chapters	integer	Counting

(b) Read: Variates of type (3) would be most appropriate for reading, because they measure the *content* of a book.

(b) Fit in bag: Variates of type (1) would be most appropriate for fitting in a bag, because they measure the *physical dimensions* of a book.