Example 1. A manufacturer of light bulbs claims that bulbs it produces last more than 1,000 hours on average. A sample of 100 bulbs are tested by a consumer affairs officer, and the sample mean and standard deviation of the lifetimes are 991.0 hours and 87.2 hours respectively. What should the manufacture conclude regarding the mean lifetimes of the bulbs?

Solution
Example 2. A producer of steel cables wants to determine whether the steel cables it produces has a mean breaking strength of 5000 tonnes. An average breaking strength of less than this would not be adequate, and to produce steel cables stronger than this would incur a greater cost. A random sample of 64 cable pieces gives a sample mean breaking strength of 5158.3 tonnes with a standard deviation of 498.2 tonnes. What should the manufacturer conclude about the mean breaking strength of the cables produced, at the

1. 5% level of significance?

2. 1% level of significance?

Explain any difference in the two conclusions.

Solution
Example 3. A company has produced a new type of steel-belted radial tyre that it claims will last at least 64,000 km on average. A random sample of 16 tyres gave a sample average of 61,000 km with a standard deviation of 5,000 km. Test the company’s claim at the 2.5% level of significance. What are the business implications of the conclusion? What are the consequences of a Type I error?

Solution
Example 4. A pizza delivery shop advertises that it will deliver pizzas in the local area within half an hour of ordering or the pizza is free. The manager feels that this marketing idea will be profitable as long as at least 90% of the deliveries are within the time. To test if this is the case, the manager takes a random sample of 20 deliveries and finds that 16 were delivered on time. What should the manager conclude about the proportion of pizzas that are delivered within the required time?

Solution
Example 5. A television network decides to cancel one of its shows if it is convinced that less than 14% of the viewing public are watching it. A random sample of 1,500 households with televisions is selected, and 200 of them watch the show. Should the show be cancelled?

Solution