

4. Waiting times (in hours) at a popular restaurant are believed to have an approximately normal distribution with a standard deviation of 1.5 hours during busy periods. The waiting times for 10 customers are given below.

1.00 1.75 1.25 1.00 2.00 1.25 1.50 1.75 1.25 1.75

- (a) Find the mean waiting time for the 10 customers

$$\bar{x} = 1.45$$

- (b) Give a 96% confidence interval for the mean waiting time.

A 96% confidence interval for the mean waiting time is given by $(1.45 - 2.054 \frac{1.5}{\sqrt{10}}, 1.45 + 2.054 \frac{1.5}{\sqrt{10}}) \approx (0.476, 2.424)$.

- (c) Explain what 96% confidence means.

The confidence level gives the probability that the method will produce an interval that contains the true value of the parameter. In other words, approximately 96% of all 96% confidence intervals will contain the true value of the parameter.

- (d) Without making any computations, explain how the length of a 90% confidence interval would compare to length of the confidence interval computed in (b).

A 90% confidence interval would be shorter in length than the confidence interval computed in (b).

5. The oxygen uptakes (in milliliters) during incubation of a random sample of 15 cell suspensions are given below.

11.1 11.2 12.2 12.8 12.9
13.2 13.2 13.7 14.0 14.1
14.1 14.5 15.2 15.4 16.0

- (a) Formulate null and alternative hypotheses to determine whether the population mean differs from 12 ml.

$$H_0 : \mu = 12 \text{ ml}$$

$$H_a : \mu \neq 12 \text{ ml}$$