

19 It is known that 80% of all diesel cars registered in 2017 had carbon monoxide (CO) emissions less than 0.3 g/km.

Talat decides to investigate whether the proportion of diesel cars registered in 2022 with CO emissions less than 0.3 g/km has **changed**.

Talat will carry out a hypothesis test at the 10% significance level on a random sample of 25 diesel cars registered in 2022.

19 (a) (i) State suitable null and alternative hypotheses for Talat's test. **[1 mark]**

19 (a) (ii) Using a 10% level of significance, find the critical region for Talat's test. **[5 marks]**

19 (a) (iii) In his random sample, Talat finds 18 cars with CO emissions less than 0.3 g/km.
State Talat's conclusion in context. **[1 mark]**

19 (b) Talat now wants to use his random sample of 25 diesel cars, registered in 2022, to investigate whether the proportion of diesel cars in England with CO emissions more than 0.5 g/km has changed from the proportion given by the Large Data Set.

Using your knowledge of the Large Data Set, give **two** reasons why it is not possible for Talat to do this. **[2 marks]**