Question 14 **(10 marks)**

Trucks carrying iron ore for the Croc Rock mining company arrive at a weighing station. The service time T per truck is defined to be the time elapsed from the moment a truck enters the station zone, including the time to be positioned and then weighed, up to the time it leaves the zone.

It is known that the population mean $\mu(T) = 80$ seconds and the population standard deviation $\sigma(T) = 20$ seconds.

At the Croc Rock weighing station, 100 trucks are weighed.

(a) State the (approximate) distribution of the sample mean service time per truck for the 100 trucks. (3 marks)

(b) What is the probability that the sample mean service time will be more than 83 seconds? (2 marks)

Suppose that more than 100 trucks were weighed at the Croc Rock weighing station.

(c) How would this affect your answer to part (b)? Explain without recalculation. (2 marks)

It is desired that the probability that the sample mean service time will be between 80 seconds and 82 seconds is greater than 40%.

(d) Determine the minimum number of trucks that will need to be weighed. (3 marks)