Question 1

QUESTION 3

Simple Familiar
Technology Active
2020

The masses of packages of cheese produced by a company are assumed to be normally distributed with a known mean of μ grams and a standard deviation of 7.37 grams.

The packages of cheese are labelled to contain 500 grams.

Given there is a 25% probability that the mean mass of 20 randomly selected packages will be less than the labelled amount, the value of μ is

(A) 498.89

(B) 500.25

(C) 501.11

(D) 504.98

Question 2

QUESTION 7

Simple Familiar
Technology Active
2020

The heights of all students at a school were measured. A mean height of 157.0 cm was calculated from this data.

A random sample of 35 students from this school was selected. The mean height of this sample was 159.7 cm with a standard deviation of 8.7 cm.

The smallest confidence level that could be used to produce a confidence interval that contains μ, based on this sample, is

(A) 85%

(B) 90%

(C) 95%

(D) 99%

Question 3

QUESTION 4

Simple Familiar
Technology Active
2021

The mean time that visitors spend at an art exhibition is 39 minutes and the standard deviation is 6 minutes.

Determine the approximate probability that the mean time spent at the exhibition by a random sample of 35 visitors is between 38 and 40 minutes.

(A) 0.13

(B) 0.16

(C) 0.68

(D) 0.84

Question 4

QUESTION 13 (6 marks)

Simple Familiar
Technology Active
2020

Data records show that the speeds of cars at a particular location on a highway are normally distributed with a mean of 98.7 km h^{-1} and a standard deviation of 4.1 km h^{-1}. The speed limit at this location is 100 km h^{-1}.

A police officer plans to record the speeds of 20 randomly selected cars at this location.

a) Determine the expected number of cars in the sample that will be travelling within ± 1 km h^{-1} of the population mean. *[2 marks]*

b) Determine the probability that the mean speed of this sample will exceed the speed limit. *[2 marks]*

There is a 5% probability that the mean speed of this sample will exceed k.

c) Determine the value of k. *[2 marks]*

Question 5

QUESTION 18 (6 marks)

Complex Unfamiliar
Technology Active
2020

The mass of a certain species of kangaroo is known to be normally distributed with a mean mass of μ kg and standard deviation of σ kg.

When one of the kangaroos is randomly selected, the probability that its mass is greater than 83.2 kg is 0.145.

When a sample of 12 kangaroos is randomly selected, the probability that the sample mean mass is less than 74.1 kg is 0.079.

A 90% approximate confidence interval for μ is calculated using a random sample of n of the kangaroos that has a sample mean mass of 79.1 kg and a sample standard deviation equal to σ.

Determine the possible range of values that n could have been, given that the confidence interval did not contain μ.