Edexcel (U.K.) Pre 2017

Questions By Topic

S2 Chap06 Population and Samples

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4. Explain what you understand by

(a) a sampling unit,

(1)

(b) a sampling frame,

(1)

(c) a sampling distribution.

(2)

Q4

(Total 4 marks)

Leave blank

1. Before introducing a new rule the secretary of a golf club decided to find out how members might react to this rule.

(a) Explain why the secretary decided to take a random sample of club members rather than ask all the members.

(1)

(b) Suggest a suitable sampling frame.

(1)

(c) Identify the sampling units.

(1)

Q1

(Total 3 marks)

Leave blank

1. (a) Define a statistic.

(2)

A random sample $X_1, X_2, \ldots, X_n$ is taken from a population with unknown mean μ.

(b) For each of the following state whether or not it is a statistic.

(i) $\dfrac{X_1 + X_4}{2}$,

(1)

(ii) $\dfrac{\sum X^2}{n} - \mu^2$.

(1)

Q1

(Total 4 marks)

Leave blank

4. A bag contains a large number of coins:

75% are 10p coins,

25% are 5p coins.

A random sample of 3 coins is drawn from the bag.
Find the sampling distribution for the median of the values of the 3 selected coins.

(7)

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1. (a) Explain what you understand by a census.

(1)

Each cooker produced at GT Engineering is stamped with a unique serial number.
GT Engineering produces cookers in batches of 2000. Before selling them, they test a random sample of 5 to see what electric current overload they will take before breaking down.

(b) Give one reason, other than to save time and cost, why a sample is taken rather than a census.

(1)

(c) Suggest a suitable sampling frame from which to obtain this sample.

(1)

(d) Identify the sampling units.

(1)

Q1

(Total 4 marks)

Leave blank

3. A random sample $X_1, X_2, \ldots X_n$ is taken from a population with unknown mean μ and unknown variance σ^2. A statistic Y is based on this sample.

(a) Explain what you understand by the statistic Y.

(2)

(b) Explain what you understand by the sampling distribution of Y.

(1)

(c) State, giving a reason which of the following is **not** a statistic based on this sample.

(i) $\sum_{i=1}^{n} \frac{(X_i - \bar{X})^2}{n}$ (ii) $\sum_{i=1}^{n} \left(\frac{X_i - \mu}{\sigma}\right)^2$ (iii) $\sum_{i=1}^{n} X_i^2$

(2)

Leave blank

7. A bag contains a large number of coins. It contains only 1p and 2p coins in the ratio 1:3

(a) Find the mean μ and the variance σ^2 of the values of this population of coins.

(3)

A random sample of size 3 is taken from the bag.

(b) List all the possible samples.

(2)

(c) Find the sampling distribution of the mean value of the samples.

(6)

Leave blank

1. Explain what you understand by

(a) a population,

(1)

(b) a statistic.

(1)

A researcher took a sample of 100 voters from a certain town and asked them who they would vote for in an election. The proportion who said they would vote for Dr Smith was 35%.

(c) State the population and the statistic in this case.

(2)

(d) Explain what you understand by the sampling distribution of this statistic.

(1)

Leave blank

1. A factory produces components. Each component has a unique identity number and it is assumed that 2% of the components are faulty. On a particular day, a quality control manager wishes to take a random sample of 50 components.

(a) Identify a sampling frame.

(1)

The statistic F represents the number of faulty components in the random sample of size 50.

(b) Specify the sampling distribution of F.

(2)

Leave blank

6. A bag contains a large number of balls.

65% are numbered 1

35% are numbered 2

A random sample of 3 balls is taken from the bag.

Find the sampling distribution for the range of the numbers on the 3 selected balls.

(6)

Leave blank

1. A bag contains a large number of 1p, 2p and 5p coins.

50% are 1p coins
20% are 2p coins
30% are 5p coins

A random sample of 3 coins is chosen from the bag.

(a) List all the possible samples of size 3 with median 5p.

(2)

(b) Find the probability that the median value of the sample is 5p.

(4)

(c) Find the sampling distribution of the median of samples of size 3

(5)

Leave blank

1. A bag contains a large number of counters. A third of the counters have a number 5 on them and the remainder have a number 1.

A random sample of 3 counters is selected.

(a) List all possible samples.

(2)

(b) Find the sampling distribution for the range.

(3)