



Statistics: Sampling Methods

Name: _____

Class: _____

Date: _____

Time:

Total marks available:

Total marks achieved: _____

Edexcel IAL AS and A Levels Mathematics

Topic : Statistics

Type : Topic Questions

INTERNATIONAL ADVANCED LEVEL
EDEXCEL INTERNATIONAL GCSE

MATHEMATICS/
ECONOMICS/
FURTHER MATHEMATICS/
PURE MATHEMATICS
SPECIFICATION

Edexcel International Advanced Subsidiary in Mathematics (XMA01)

Edexcel International Advanced Subsidiary in Further Mathematics (XFM01)

Edexcel International Advanced Subsidiary in Pure Mathematics (XPM01)

Edexcel International Advanced Level in Mathematics (YMA01)

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Edexcel International GCSE in Economics (9-1) (4ET0)

First examination June

To be used by all students preparing for Edexcel IAL AS and A Levels Mathematics

Students of other boards may also find this useful

Q1.

Explain what you understand by

(a) a statistic,

(1)

(b) a sampling distribution.

(1)

A factory stores screws in packets. A small packet contains 100 screws and a large packet contains 200 screws. The factory keeps small and large packets in the ratio 4:3 respectively.

(c) Find the mean and the variance of the number of screws in the packets stored at the factory.

(3)

A random sample of 3 packets is taken from the factory and Y_1 , Y_2 and Y_3 denote the number of screws in each of these packets.

(d) List all the possible samples.

(2)

(e) Find the sampling distribution of \bar{Y}

(4)

Exam Papers Practice **(Total for question = 11 marks)**

Q2.

A bag contains a large number of counters with one of the numbers 5, 10 or 20 written on each of them in the ratio 5 : 2 : a

A jar contains a large number of counters with one of the numbers 5 or 10 written on each of them in the ratio 1 : 3

One counter is selected at random from the bag and then two counters are selected at random from the jar.

The random variable R represents the range of the numbers on the 3 counters.

Given that $P(R = 15) = \frac{63}{256}$

(a) by forming and solving an equation in a , show that $a = 9$

(3)

(b) find the sampling distribution of R

(6)

(Total for question = 9 marks)

Q3.

The owner of a very large youth club has designed a new method for allocating people to teams. Before introducing the method he decided to find out how the members of the youth club might react.

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

(1)

(b) Suggest a suitable sampling frame.

(1)

(c) Identify the sampling units.

(1)

The new method uses a bag containing a large number of balls. Each ball is numbered either 20, 50 or 70. When a ball is selected at random, the random variable X represents the number on the ball where

$$P(X = 20) = p \quad P(X = 50) = q \quad P(X = 70) = r$$

A youth club member takes a ball from the bag, records its number and replaces it in the bag. He then takes a second ball from the bag, records its number and replaces it in the bag.

The random variable M is the mean of the 2 numbers recorded.

Given that

$$P(M = 20) = \frac{25}{64} \quad P(M = 60) = \frac{1}{16} \quad \text{and} \quad q > r \quad (7)$$

(d) show that $P(M = 50) = \frac{1}{16}$

(Total for question = 10 marks)