Lesson 7

Hypothesis Testing : Statistics Year 1

7.1 The Binomial Distribution & Hypothesis Testing (Homework)

Question 1

S2 Examination Question from Tuesday 21st January 2008, Q1

(**a**) Explain what you understand by a census

[1 mark]

Each cooker produced at GT Engineering is stamped with a unique serial number. GT EWngineering produces cookers in batches of 2000.

Before selling them, they test a random sample of 5 to see what electrical 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 mark]

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

[1 mark]

(**d**) Identify the sampling units.

[1 mark]

S2 Examination Question from Tuesday 21st January 2008, Q2The probability of a bolt being faulty is 0.3Find the probability that in a random sample of 20 bolts there are(a) exactly 2 faulty bolts

[2 marks]

(**b**) more than 3 faulty bolts

[2 marks]

These bolts are sold in bags of 20.John buys 10 bags.(c) Find the probability that exactly 6 of these

(c) Find the probability that exactly 6 of these bags contain more than 3 faulty bolts.

[3 marks]

S2 Examination Question from Tuesday 21st January 2008, Q5 Dhriti grows tomatoes. Over a period of time, she has found that there is a probability 0.3 of a ripe tomato having a diameter greater than 4 cm. She decides to try a new fertiliser.

In a random sample of 40 ripe tomatoes, 18 have a diameter greater than 4 cm. Dhriti claims that the new fertiliser has increased the probability of a ripe tomato being greater than 4 cm in diameter.

Test Dhriti's claim at the 5% level of significance. State your hypotheses clearly.

S2 Examination Question from Friday 18th January 2013, Q3 A random variable *X* has the distribution B(12, *p*)

(a) Given that p = 0.25, find

(i) P(X < 5)

 $(\mathbf{ii}) \qquad \mathbf{P}(X \ge 7)$

[3 marks]

(**b**) Given that P(X=0) = 0.05, find the value of p to 3 decimal places

[3 marks]

S2 Examination Question from Tuesday 17th January 2012, Q2 David claims that the weather forecasts produced by local radio are no better that those achieved by tossing a fair coin and predicting rain if a heads is obtained or no rain if a tail is obtained.

He records the weather for 30 randomly selected days. The local radio forecast is correct on 21 of these days.

Test David's claim at the 5% level of significance.

State your hypotheses clearly.

[7 marks]