Lesson 6

Hypothesis Testing : Statistics Year 1

6.1 More Examination Questions

Question 1

S2 Examination Question from Wednesday 21st January 2009, Q3

A single observation x is to be taken from a Binomial distribution B(20, p)

This observation is used to test $H_0 : p = 0.3$ against $H_1 : p \neq 0.3$

(a) Using a 5% level of significance, find the critical region for this test.
The probability of rejecting either tail should be as close as possible to 2.5%

[3 marks]

(b) State the actual significance level of this test.

[2 marks]

The actual value of x obtained is 3

(c) State a conclusion that can be drawn based on this value, giving a reason for your answer.

[2 marks]

Question 2

S2 Examination Question from Friday 14th January 2011, Q2

A student takes a multiple choice test.
The test is made up of 10 questions each with 5 possible answers.
The student gets 4 questions correct.
Her teacher claims she was guessing the answers.
Using a one tailed test, at the 5% level of significance, test whether or not there is evidence to reject the teacher's claim.

State your hypotheses clearly.

[6 marks]

Question 3

S2 Examination Question from Tuesday 16th January 2007, Q6

Past records from a large supermarket show that 20% of people who buy chocolate bars buy the family size bar. On one particular day a random sample of 30 people was taken from those that had bought chocolate bars and 2 of them were found to have bought a family size bar.

(a) Test, at the 5% significance level, whether or not the proportion p of people who bought a family size bar of chocolate that day had decreased.
State your hypotheses clearly.

[6 marks]

The manager of the supermarket thinks that the probability of a person buying a gigantic chocolate bar in only 0.02. To test whether this hypothesis is true the manager decides to take a random sample of 200 people who bought chocolate bars.

(b) Find the critical region that would enable the manager to test whether or not there is evidence that the probability is different from 0.02.
The probability of each tail should be as close to 2.5% as possible.

[6 marks]

(c) Write down the significance level of this test.

[1 mark]

Question 4

S2 Examination Question from Tuesay 19th January 2010, Q6

(a) Define the critical region of a test statistic.

[2 marks]

A discrete random variable X has a Binomial distribution B(30, p)

A single observation is used to test $H_0 : p = 0.3$ against $H_1 : p \neq 0.3$

(b) Using a 1% level of significance find the critical region of this test. You should state the probability of rejection in each tail which should be as close as possible to 0.005

[5 marks]

(c) Write down the actual significance level of the test.

[1 mark]

The value of the observation was found to be 15.

(d) Comment on this finding in light of your critical region.

[2 marks]