

Topic: Hypothesis Testing - Binomial

Day 4 Question 1

Sue throws a fair coin 15 times and records the number of times it shows a head.

- (a) State the distribution to model the number of times the coin shows a head. (2)

Find the probability that Sue records

- (b) exactly 8 heads, (2)
- (c) at least 4 heads. (2)

Sue has a different coin which she believes is biased in favour of heads. She throws the coin 15 times and obtains 13 heads.

- (d) Test Sue's belief at the 1% level of significance. State your hypotheses clearly. (6)

Day 4 Question 2

A potter believes that 20% of pots break whilst being fired in a kiln. Pots are fired in batches of 25.

- (a) Let X denote the number of broken pots in a batch. A batch is selected at random. Using a 10% significance level, find the critical region for a two tailed test of the potter's belief. You should state the probability in each tail of your critical region. (4)

The potter aims to reduce the proportion of pots which break in the kiln by increasing the size of the batch fired. He now fires pots in batches of 50. He then chooses a batch at random and discovers there are 6 pots which broke whilst being fired in the kiln.

- (b) Test, at the 5% level of significance, whether or not there is evidence that increasing the number of pots in a batch has reduced the percentage of pots that break whilst being fired in the kiln. State your hypotheses clearly. (5)