

爱德思
Statistics 2
分类真题
2014-2022 册

A Level Clouds 出品

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Chapter 1

Binomial Distribution
(Comprehensive)

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1. The probability of a leaf cutting successfully taking root is 0.05

Find the probability that, in a batch of 10 randomly selected leaf cuttings, the number taking root will be

- (a) (i) exactly 1
(ii) more than 2

(5)

A second random sample of 160 leaf cuttings is selected.

- (b) Using a suitable approximation, estimate the probability of at least 10 leaf cuttings taking root.

(3)

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2. Bill believes that only 30% of customers would like a greater choice on the menu. He takes a random sample of 50 customers and finds that 20 of them would like a greater choice on the menu.

- (d) Test, at the 5% significance level, whether or not the percentage of customers who would like a greater choice on the menu is more than Bill believes. State your hypotheses clearly.

(6)

7. The random variable $Y \sim B(n, p)$.

Using a normal approximation the probability that Y is at least 65 is 0.2266 and the probability that Y is more than 52 is 0.8944

Find the value of n and the value of p .

(12)

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1. (a) State the conditions under which the Poisson distribution may be used as an approximation to the binomial distribution. (1)

A farmer supplies a bakery with eggs. The manager of the bakery claims that the proportion of eggs having a double yolk is 0.009

The farmer claims that the proportion of his eggs having a double yolk is more than 0.009

- (b) State suitable hypotheses for testing these claims. (1)

In a batch of 500 eggs the baker records 9 eggs with a double yolk.

- (c) Using a suitable approximation, test at the 5% level of significance whether or not this supports the farmer's claim. (5)

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4. Pieces of ribbon are cut to length L cm where $L \sim N(\mu, 0.5^2)$
- (a) Given that 30% of the pieces of ribbon have length more than 100 cm, find the value of μ to the nearest 0.1 cm. (3)

John selects 12 pieces of ribbon at random.

- (b) Find the probability that fewer than 3 of these pieces of ribbon have length more than 100 cm. (3)

Aditi selects 400 pieces of ribbon at random.

- (c) Using a suitable approximation, find the probability that more than 127 of these pieces of ribbon will have length more than 100 cm. (6)

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5. A company claims that 35% of its peas germinate. In order to test this claim Ann decides to plant 15 of these peas and record the number which germinate.

- (a) (i) State suitable hypotheses for a two-tailed test of this claim.
(ii) Using a 5% level of significance, find an appropriate critical region for this test. The probability in each of the tails should be as close to 2.5% as possible.

(4)

- (b) Ann found that 8 of the 15 peas germinated. State whether or not the company's claim is supported. Give a reason for your answer.

(2)

- (c) State the actual significance level of this test.

(1)