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2. Duck eggs are classed as large or small.

Kiyoshi knows that 35% of the eggs laid by his ducks are classed as large and the rest are classed as small. The eggs are randomly allocated to boxes each containing 6 eggs.

A box is selected at random.

Calculate the probability that this box contains

(a) (i) exactly 2 large eggs,

(ii) more large eggs than small eggs.

(5)

Kiyoshi believes that the proportion of large eggs produced by the ducks will increase if he adds a supplement to the ducks' food. To check his belief he takes a random sample of 50 eggs after the supplement has been added to the ducks' food and finds that 25 of them are large eggs.

(b) Use a suitable test, at the 5% level of significance, to determine whether or not there is evidence to support Kiyoshi's belief. State your hypotheses clearly.

(5)

Kiyoshi sells boxes that contain more large eggs than small eggs for a profit of £1.20 and the rest of the boxes for a profit of £0.60

The proportion of large eggs produced by Kiyoshi's ducks has increased to 45% and the cost of the supplement is £0.10 per box of eggs. Given that the eggs are still randomly allocated to boxes,

(c) explain whether or not Kiyoshi should continue to add the supplement to the ducks' food in order to make a greater profit.

(5)

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Question 2 continued

(Total 15 marks)

Q2