

Question 13

(12 marks)

According to the Association of Poultry Farmers, 35% of people living in Melbourne purchase free-range eggs.

- (a) If a random sample of 100 people living in Melbourne is surveyed, what is the probability that the sample proportion of people who purchase free-range eggs will be less than 0.28? (3 marks)

A market research company wants to know whether the proportion p of people living in Perth who purchase free-range eggs is similar to that of Melbourne. A junior employee proposes that it gather a sample of shoppers by standing outside a particular shop between 9 am and 10 am on a Tuesday morning and asking all shoppers entering the shop if they purchase free-range eggs.

- (b) Identify and explain **two** sources of bias in the proposed sampling method. (4 marks)

The company does not follow the suggestion of the junior employee and instead randomly samples 243 people living in Perth and asks them whether they purchase free-range eggs. On the basis of the results of their survey, a confidence interval for p is calculated to be (0.2520, 0.3488).

(c) Determine the number of people in the sample who purchase free-range eggs. (2 marks)

(d) Determine the level of confidence that was used to calculate the confidence interval. (3 marks)