# 2.4 Statistics: Statistical Distributions (Binomial/Normal): 10-minute Pack

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** Fatima is an engineer testing a large batch of light bulbs. It is known that 15% of bulbs in the batch are defective. She takes a random sample of 14 bulbs. Let X be the number of defective bulbs in the sample, so X ~ B(14, 0.15).

**(a)** Write down the values of E(X) and Var(X). **(2)**

**(b)** Calculate P(X ≤ 2). **(2)**

**(c)** Calculate the probability that at least 4 bulbs in the sample are defective. **(2)**

**(Total for Question 1 is 6 marks)**


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## Question 1

| | |
|---|---|
| (a) E(X) = 14 x 0.15 = 2.1, cao | **B1** |
| (a) Var(X) = 14 x 0.15 x 0.85 = 1.785, cao | **B1** |
| **(a) Answer: E(X) = 2.1, Var(X) = 1.785** | |
| (b) sums P(X=0)+P(X=1)+P(X=2) using the binomial formula or cumulative tables | **M1** |
| (b) P(X≤2) = awrt 0.648 | **A1** |
| **(b) Answer: P(X≤2) = awrt 0.648** | |
| (c) uses P(X≥4) = 1 - P(X≤3), with P(X=3) = C(14,3) x $0.15^3$ x $0.85^{11}$ found and added to part (b) | **M1** |
| (c) P(X≥4) = awrt 0.147 | **A1** |
| **(c) Answer: P(X≥4) = awrt 0.147** | |


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