# The Poisson distribution

Answers

**Further Maths topic practice**

This topic online

| Q | Answer | Marks |
|---|---|---|
| 1 | **a)** 0.1850 **b)** 0.8641 **c)** 1.87 | 4 |
| 2 | **a)** Any two of: emails arrive independently of each other; one at a time (singly); at a constant average rate<br>**b)** 0.1339 **c)** 0.3233 | 5 |
| 3 | **a)** mean 1.76 (1.7625), variance 1.58<br>**b)** For a Poisson distribution the mean equals the variance, and these are close<br>**c)** 0.1716 | 5 |
| 4 | **a)** 0.0498 **b)** 0.4754 | 5 |
| 5 | **a)** The numbers of robins and blackbirds visiting are independent **b)** 0.1563<br>**c)** 0.7619 | 5 |
| 6 | **a)** $e^{(}-\lambda)\lambda^3/6 = 2e^{(}-\lambda)\lambda^2/2$ gives $\lambda = 6$ **b)** 0.7149 | 5 |
| 7 | **a)** 0.3012 **b)** 0.2389 **c)** 0.3707 | 6 |
| 8 | **a)** $X \sim B(250, 0.012)$ **b)** $n = 250$ is large and $p = 0.012$ is small ($np = 3$)<br>**c)** 0.4232 **d)** 0.4232 is very close to 0.4218, so the approximation is good | 6 |
| 9 | **a)** 0.7127 **b)** 0.1875 | 6 |
| 10 | **a)** 0.2613 **b)** 4 hours | 6 |
| 11 | **a)** $(1 - p)^4 = 0.9606$ gives $p = 0.0100$ (2 d.p.: 0.01) **b)** mean 6, variance 5.94<br>**c)** 0.1528<br>**d)** Mean 6 and variance 5.94 are almost equal, as they are for a Poisson distribution; n is large and p is small | 9 |
| 12 | **a)** 0.1042 **b)** 0.1122 **c)** 0.2060 **d)** 0.3787 | 10 |

Full worked solutions, written out by hand, are on the solutions sheet for this topic.


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