Worksheet B: Further modelling using the Poisson distribution

Investigate whether any of the situations below are suitable to be modelled using a Poisson distribution.

1. The number of coffees sold per hour in a coffee shop is recorded throughout the day:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hour  1** | **Hour  2** | **Hour  3** | **Hour  4** | **Hour  5** | **Hour  6** | **Hour  7** | **Hour  8** | **Hour  9** | **Hour 10** |
| 45 | 67 | 52 | 22 | 12 | 72 | 54 | 34 | 12 | 20 |

Give one reason based on the data and one other reason why a Poisson distribution is unlikely to be a suitable model.

1. The number of TVs sold per day in a large electrical store over a 10-day period is recorded below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Day 1** | **Day 2** | **Day 3** | **Day 4** | **Day 5** | **Day 6** | **Day 7** | **Day 8** | **Day 9** | **Day 10** |
| 5 | 9 | 5 | 12 | 3 | 19 | 11 | 3 | 15 | 9 |

Comment on the suitability of a Poisson distribution to model this situation.

Worksheet B: Further modelling using the Poisson distribution continued

1. On average, a stretch of road has 16 accidents per month. Give two assumptions needed to model this as a Poisson distribution and a limitation of this model.
2. A taxi company’s records show the number of breakdowns that occur each week:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of breakdowns per week | 0 | 1 | 2 | 3 | 4 |
| Frequency | 11 | 8 | 12 | 10 | 10 |

Comment on the suitability of a Poisson distribution to model this situation.