Part 8.4: Mean and Standard Deviation

You may have also noticed that on the formula sheet we are given the formulas for the mean ($\mu = \lambda$) and the standard deviation ($\sigma = \sqrt{\lambda}$). We can use these to very quickly work out the standard deviation, as obviously the mean is already given to us in most situations. Let's look at an example:

Example
My car has broken down 10 times in the last 8 years. What is the mean and the standard deviation for the number of times it is likely to break down in the next year?

Answer
Well… we know from previously the average number of breakdowns is $\frac{10}{8} = 1.25$ and the standard deviation is $\sigma = \sqrt{\lambda} = \sqrt{1.25} = 1.118$ (4sf).

Exercise 8.4

1. The number of worms per m^2 of garden is on average 35. Calculate the mean and standard deviation for the number of worms in:
    a. 1 m^2.
    b. 5 m^2.
    c. 10 m^2.
2. The number of detentions given out at a school is approximately 20 per day. Calculate the mean and standard deviation for the number of detentions in:
    a. 1 day.
    b. 1 week (5 days).
    c. 1 term (10 weeks).
3. There have been 10 accidents on a 2km stretch of motorway in the last year. Calculate the mean and standard deviation for the number of accidents in:
    a. 1 year.
    b. 1 week.
    c. 1 month.
4. The number of sandwiches that I eat for lunch is on average 2.5. Calculate the mean and standard deviation for the number of sandwiches I eat in:
    a. 1 day.
    b. 1 week (7 days).
    c. 1 month (30 days).