Part 7.7 Answers

1a. A binomial distribution is best. This is because:

- There are a **F**ixed number of teachers at the school (130) so a fixed number of 'trials'
- The probability one teacher is involved is **I**ndependent from the other teachers
- The probability of each teacher being involved is always the **S**ame (0.65)
- There are **T**wo possible outcomes, either the teacher is involved or not.

1b. 1.00 (3sf)
1c. 84.5 so 85 teachers
1d. 95 teachers

2a. A binomial distribution is best. This is because:

- There are a **F**ixed number of coin flips so a fixed number of 'trials'
- The probability one flip is heads is **I**ndependent from the other flips
- The probability of each flip being heads is always the **S**ame (0.5 if it is fair)
- There are **T**wo possible outcomes, either heads or tails.

2b. 0.0176 (3sf)
2c. $\sigma = 5$, $\mu = 50$
2d. 0.542 or 0.558 (3sf) so therefore not a fair coin.

3a. A binomial distribution is best. This is because:

- There are a **F**ixed number of days we will look at so a fixed number of 'trials'
- The probability one flip is foggy can be assumed to be **I**ndependent from the other days
- The probability of each day being foggy is always the **S**ame (0.05)
- There are **T**wo possible outcomes, either the day is foggy or it is not.

3b. 0.698 (3sf)
3c. 0.00376 (3sf)
3d. 21 days
3e. 0.00376 x 0.00376 = 0.0000141
This assumes that each day, and each week is independent of each other. This may not be a valid assumption as bad weather often will hit several days in a row, and in winter you are more likely to get bad weather.