Homework 1: Due Wednesday, February 2

1. Consider the sample:

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   11.67  9.16  9.08 12.76 14.96 18.11 15.40
   ```

   Compute the sample mean and variance for this sample.

2. Show that
$$S^2 = \frac{1}{n-1}\left(\sum_{i=1}^{n} X_i^2 - \frac{\left(\sum_{i=1}^{n} X_i\right)^2}{n}\right),$$
   is an estimator such that $\mathbb{E}(S^2) = \sigma^2$.

3. Prove the central limit theorem for general mean μ and variance σ^2. (Show that for $S_n = X_1 + \ldots + X_n$, $\frac{S_n - n\mu}{\sqrt{n}\sigma} \xrightarrow{d} N(0,1)$).

4. Problems from the textbook: 4.2.1, 4.2.7, 4.4.5, 5.2.11, 5.3.2, 5.3.4, 5.3.13.