1. \( R16.8 \)

2. \( R16.9 \)

3. You are to use the data set Ecn1_wag to answer this question. Using only the information on the hourly wage rate, you are to estimate the parameters characterizing the hourly wage density given by

\[
f_W(w) = \alpha \exp(-\alpha(w - c)), \quad w > c \geq 0, \quad \alpha > 0.
\]

Begin by defining the appropriate parameter space for the model. Obtain the maximum likelihood estimator of the vector \((\alpha, c)^0\) by first forming the m.l.e. of \(c\) and then concentrating the likelihood function (now defined in terms of \(\alpha\) only) based on this estimator. What is the \(\sqrt{n}\) sampling distribution of \(\hat{c}\)? What is the \(\sqrt{n}\) sampling distribution of \(\hat{\alpha}\)? In particular, in computing the \(\sqrt{n}\) sampling distribution of \(\hat{\alpha}\) do you need to take account of the fact that your estimator of \(\hat{\alpha}\) is conditional on the estimate of \(c\)? Why or why not?