

STAT 520 – Homework 1A – Fall 2023

1) Construct a time series plot of the Dubuque temperature data that we studied in class, but include the monthly plotting symbols. Note that the temperature data and the month information are in the `tempdub` object in the `TSA` package. Type `library(TSA); data(tempdub); print(tempdub)` in R to see the data set.

2) Consider two random variables,  $X$  and  $Y$ . Suppose  $E(X) = 6$ ,  $\text{var}(X) = 9$ ,  $E(Y) = 0$ ,  $\text{var}(Y) = 4$ , and  $\text{corr}(X, Y) = 0.25$ . Find the following, showing all your steps:

(a)  $\text{var}(X + Y)$

(b)  $\text{cov}(X, X + 2Y)$

(c)  $\text{cov}(4X - 3Y, X + 2Y)$

(d)  $\text{corr}(X + Y, X - Y)$