

MTH 325, Quiz #9, Spring 2024 Name \_\_\_\_\_

**Instructions:** Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. Using the built-in data on AirPassengers, perform the following analyses of the time series.
  - a. Plot the time series and paste the graph below.
  - b. Use the `decompose()` function to decompose the time series into seasonal, trend and random components. Plot the graph(s) and paste them below. Describe the trend.
  - c. Calculate the first differences. Plot the resulting differences. Does it appear stationary? Plot the first differences in a histogram and qqplot. Do the values appear to be normal? Paste all three graphs below.
  - d. From your decomposition object, extract the random element and plot a histogram and qqplot. Do these errors appear to be normal? Plot the graphs below.