

Assignment 7

Q. A project was created to assess the effect of temperature on the energy output of a Combined Cycle Power Plant. 250 paired observations was collected on the hourly average Temperature (in degree centigrade) and Energy Output (in Megawatts). The 250 pairwise observations are stored in two data vectors `temp` and `output` as follows:

`temp:`

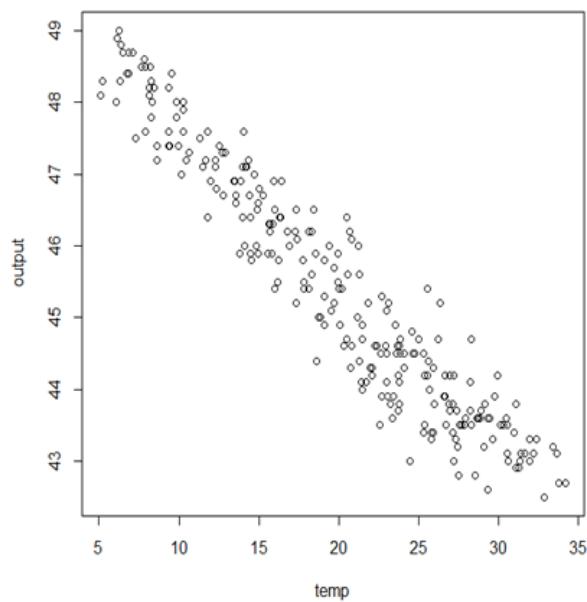
8.34, 23.64, 29.74, 19.07, 11.8, 13.97, 22.1, 14.47, 31.25, 6.77, 28.28, 22.99, 29.3, 8.14, 16.92, 22.72, 18.14, 11.49, 9.94, 23.54, 14.9, 33.8, 25.37, 7.29, 13.55, 6.39, 26.64, 7.84, 21.82, 27.17, 13.42, 20.77, 8.29, 30.98, 31.96, 15.83, 22.56, 25.91, 8.24, 24.66, 29.31, 21.48, 18.28, 26.96, 16.01, 27.37, 16.3, 23.8, 8.19, 25.28, 21.47, 30.54, 18.3, 25.82, 31.12, 15.99, 8.42, 23.7, 15.71, 29.11, 23.73, 28.26, 15.92, 33.4, 31.92, 26.87, 5.23, 15.72, 17.74, 27.13, 25.82, 34.2, 19.13, 11.77, 10.25, 23.82, 30.1, 29.92, 29.63, 30.61, 16.18, 31.66, 29.14, 18.4, 15.86, 6.31, 23.4, 33.62, 6.89, 27.41, 26.37, 26.58, 15.25, 21.24, 24.98, 26.63, 18.87, 5.12, 31.1, 7.91, 14.97, 28.92, 22.92, 12.55, 9.38, 10.28, 30.31, 25.34, 30.47, 20.18, 21.31, 22.1, 20.09, 22.36, 9.43, 28.86, 23.25, 22.7, 21.3, 19.94, 14.97, 13.83, 23.39, 21.48, 22.63, 20.01, 20.52, 13.58, 14.38, 28.53, 13.89, 25.93, 17.84, 6.28, 8.16, 18.61, 16.23, 8.66, 19.53, 10.17, 6.48, 12.69, 23.77, 14.43, 28.25, 12.26, 14.55, 24.57, 10.25, 21.96, 9.82, 18.58, 20.57, 8.61, 9.99, 13.97, 16.76, 25.58, 17.34, 19.13, 12.75, 29.46, 15.59, 14.2, 14.05, 32.35, 21.41, 10.61, 19.13, 17.28, 24.79, 28.66, 12.91, 17.32, 18.74, 26.69, 12.28, 14.46, 30.54, 27.58, 32.17, 26.23, 11.69, 14.73, 12.36, 9.52, 27.32, 23.81, 7.92, 23.58, 20.78, 19.68, 14.12, 22.97, 6.89, 19.98, 21.71, 23.02, 27.71, 10.46, 27.18, 25.56, 19.69, 31.37, 14.17, 15.6, 25.3, 7.09, 6.07, 9.86, 14.73, 31.32, 6.14, 27.92, 25.63, 16.37, 28.31, 24.44, 11.33, 23.87, 21.14, 22.24, 23.07, 25.95, 16.44, 20.66, 15.01, 20.51, 24.1, 9.38, 27.49, 32.84, 20.83, 28.69, 9.35, 17.37, 14.84, 27.88, 17.83, 7.64, 25.67, 23.1, 27.13, 26.95, 19.4, 13.5, 11.97, 18.11, 24.1, 20.29

`output:`

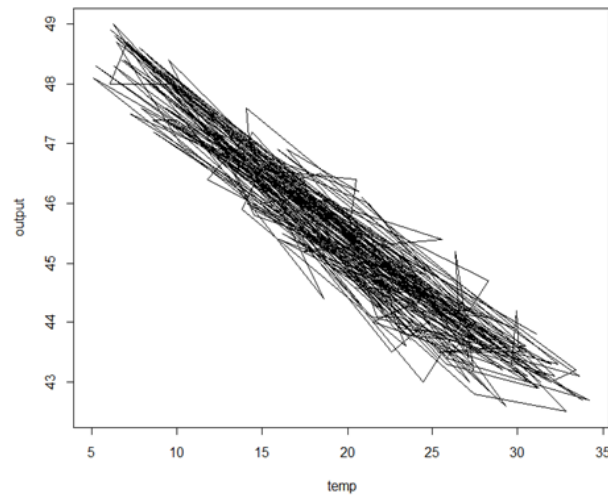
48, 44.6, 43.9, 45.3, 46.4, 47.1, 44.2, 46.4, 42.9, 48.4, 43.5, 45.1, 42.6, 48.1, 46, 45.3, 46.2, 47.1, 47.4, 44.9, 46.5, 42.7, 44.2, 47.5, 46.7, 48.8, 43.9, 48.6, 45.2, 43, 46.9, 44.3, 48.3, 43.4, 43.3, 45.9, 43.5, 44.3, 47.8, 44.5, 43.6, 44.7, 46.2, 44.2, 45.4, 43.7, 46.4, 44.1, 48.5, 44.5, 44, 43.1, 45.6, 43.3, 42.9, 46.5, 48.2, 43.7, 46.3, 43.2, 44.2, 44.1, 46.9, 43.2, 43, 43.8, 48.3, 46.2, 45.8, 43.8, 43.4, 42.7, 44.9, 47.6, 47.9, 44.7, 43.5, 44.2, 43.3, 43, 45.5, 43.1, 43.8, 46.5, 46.3, 48.3, 43.9, 43.1, 48.4, 43.2, 45.2, 43.9, 46.7, 46, 44.7, 44.2, 45, 48.1, 43.8, 47.6, 45.9, 43.7, 44.6, 47.4, 48.2, 48, 43.5, 43.5, 43.6, 45.4, 45.6, 44.3, 44.9, 44.6, 47.4, 43.6, 43.8, 43.9, 44.4, 45.9, 46.6, 45.9, 43.6, 44.9, 44.5, 45.4,

46.4, 46.6, 47.2, 42.8, 46.9, 43.4, 45.5, 49, 48.2, 44.4, 45.8, 47.2, 45.1, 47, 48.7, 47.3, 44.6, 46.7, 43.7, 47.1, 45.8, 44.8, 47.6, 44.3, 47.8, 45.9, 45.6, 47.4, 47.4, 46.4, 46.2, 45.4, 45.2, 45.3, 46.7, 43.6, 45.9, 47.1, 47.6, 43.3, 44.1, 47.3, 45.8, 46.2, 44.5, 43.6, 47.3, 46.5, 45, 43.5, 47.2, 45.9, 43.5, 43.5, 43.1, 44.7, 47.2, 47, 46.8, 48.4, 43.3, 43.8, 48.5, 44.5, 44.6, 45.2, 46, 44.5, 48.7, 45.5, 44.1, 44.1, 43.5, 47.2, 44.2, 44.2, 45.7, 43.1, 47.1, 46.3, 43.4, 48.7, 48, 48, 47, 43, 48.9, 43.6, 44.4, 46.4, 44.7, 43, 47.5, 44.5, 45, 44.6, 43.9, 43.8, 46.9, 46.2, 46.8, 44.7, 44.5, 47.4, 42.8, 42.5, 46.1, 43.6, 47.6, 46.1, 46, 43.5, 45.4, 48.5, 44, 45.2, 43.4, 43.7, 46, 46.9, 46.9, 45.4, 44.3, 44.6

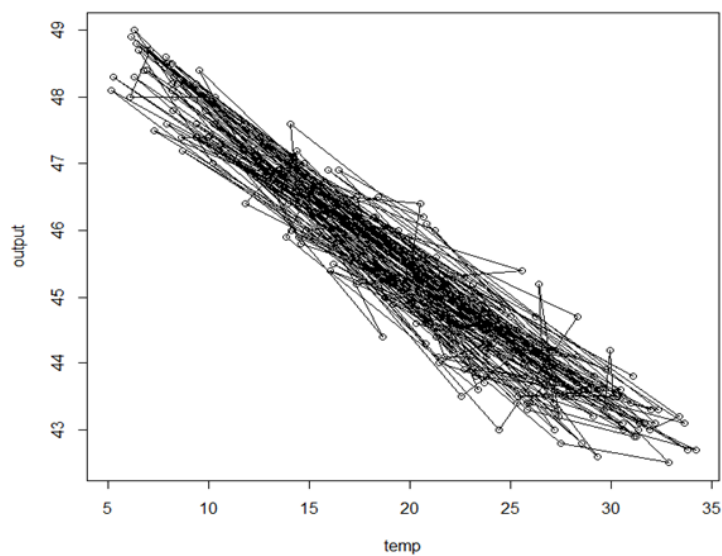
1. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:



2. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:



3. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:

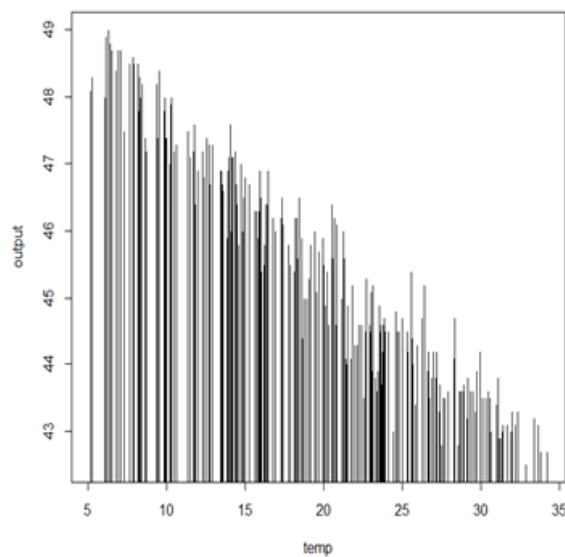


4. The value of correlation coefficient between `temp` and `output` is

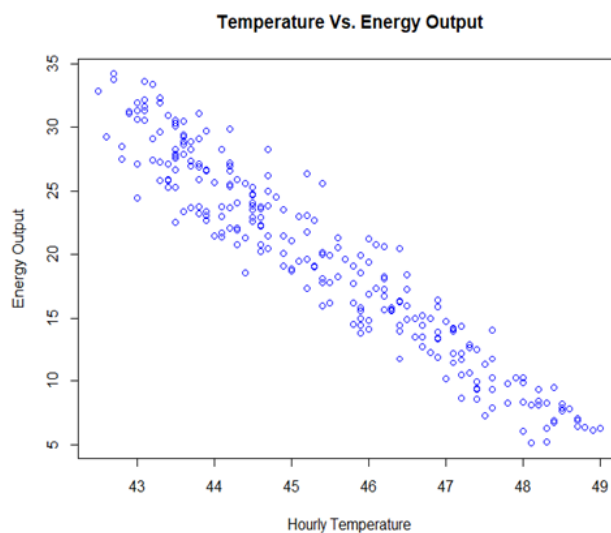
5. Which of the following statement in R is correct about the value of correlation coefficient between **temp** and **output**; and **output** and **temp**

- a. **`cor(temp, output) > cor(output, temp)`**
- b. **`cor(temp, output) < cor(output, temp)`**
- c. **`cor(temp, output) = cor(output, temp)`**
- d. **`cor(temp, output) ≠ cor(output, temp)`**

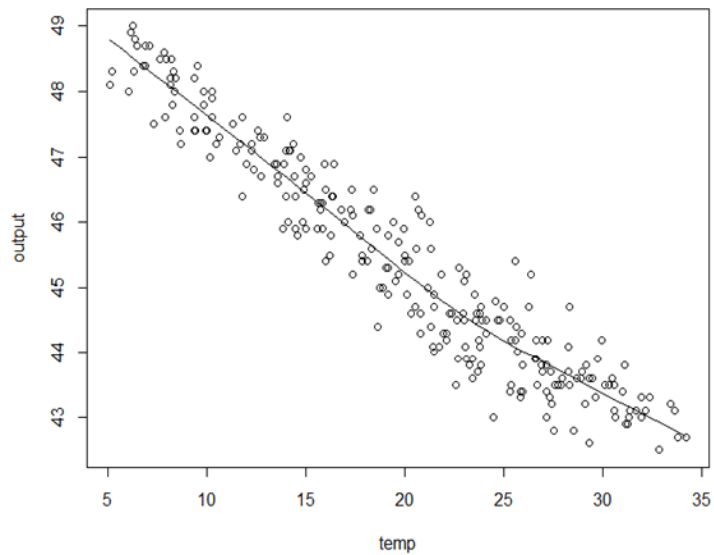
6. What will be the correct R command to draw the following plot between the data in data vectors **temp** and **output**:



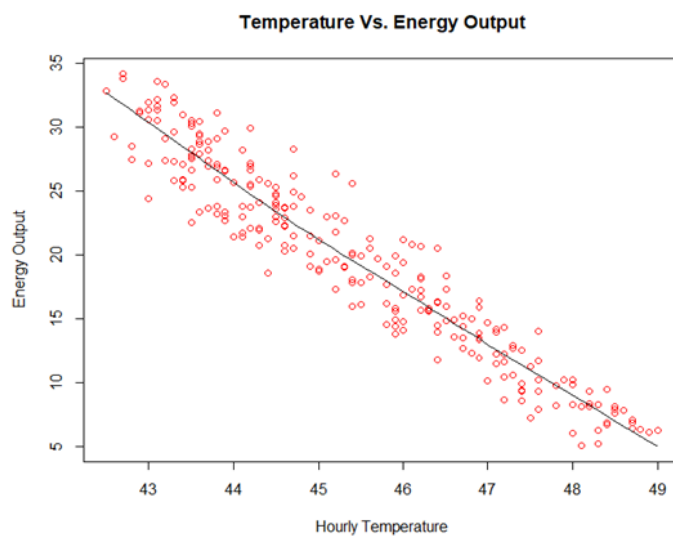
7. What will be the correct R command to draw the following plot between the data in data vectors **temp** and **output**:



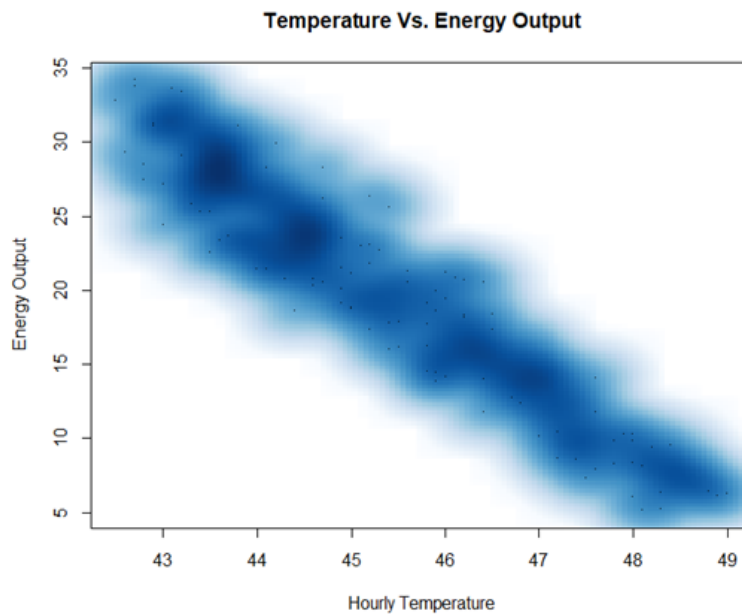
8. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:



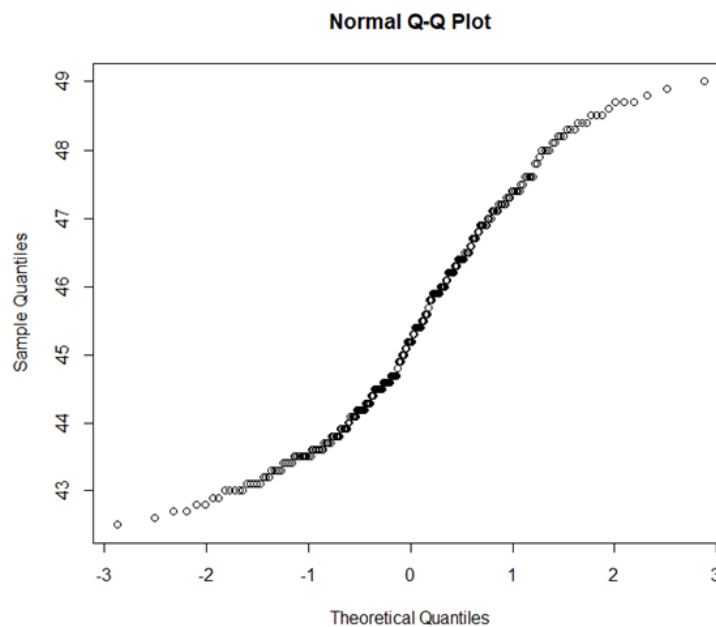
9. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:



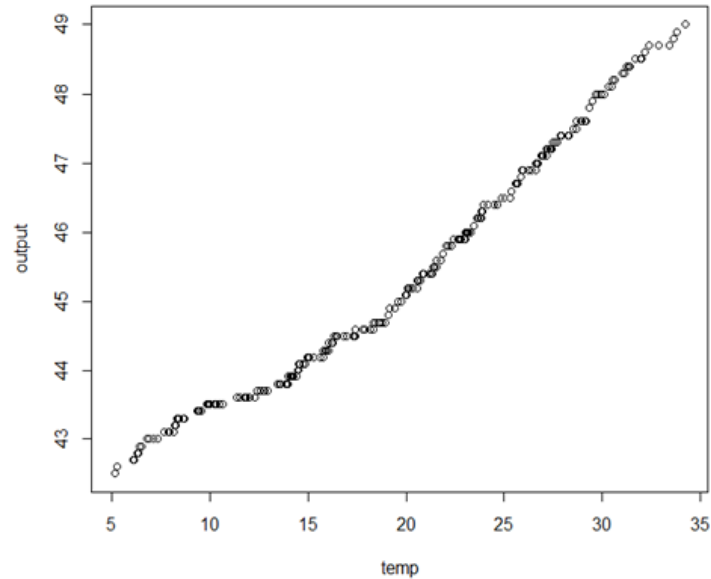
10. What will be the correct R command to draw the following plot between the data in data vectors `temp` and `output`:



11. What will be the correct R command to draw the following QQ plot of the data vectors `temp` and `output`:



12. What will be the correct R command to draw the following QQ plot of the data vectors `temp` and `output`:



13. Suppose the value of correlation coefficient between `temp` and `output` comes out to be nearly zero. Then which of the following statement(s) can be true:

- a. Statement 1: `output` and `temp` are independent.
- b. Statement 2: `output` and `temp` may have a strong linear relationship.
- c. Statement 3: `output` and `temp` may have a strong nonlinear relationship.