Homework 7 – Intro. to Computational Statistics

You collect the following data on four people sampled at random:

Age	IQ
23	100
18	105
10	95
45	120

Is there an effect of Age on IQ? Please perform all calculations by hand using the equations in the lessons unless otherwise specified.

1. Plot these four points using R.
2. Calculate the covariance between age and IQ.
3. Calculate their correlation. What does the number you get indicate?
4. Calculate the regression coefficients β_0 and β_1 and write out the equation of the best-fit line relating age and IQ.
5. Calculate the predicted $\hat{y}_i$ for each x_i.
6. Calculate R^2 from the TSS/SSE equation. How does it relate to the correlation? What does the number you get indicate?
7. Calculate the standard error of β_1, and use that to test (using the t test) whether β_1 is significant.
8. Calculate the p-value for β_1 and interpret it.
9. Calculate the 95% CI for β_1 and interpret it.
10. Confirm your results by regressing IQ on Age using R.
11. Plot your points again using R, including the linear fit line with its standard error.
12. What are you final conclusions about the relationship between age and IQ?