

Problem 2.3, page 60 in 5e Wooldridge

The following table contains the ACT scores and the GPA (grade point average) for eight college students. Grade point average is based on a four-point scale and has been rounded to one digit after the decimal.

Student	GPA	ACT
1	2.8	21
2	3.4	24
3	3.0	26
4	3.5	27
5	3.6	29
6	3.0	25
7	2.7	25
8	3.7	30

- (i) Estimate the relationship between GPA and ACT using OLS; that is, obtain the intercept and slope estimates in the equation

$$\widehat{GPA} = \hat{\beta}_0 + \hat{\beta}_1 ACT$$

Comment on the direction of the relationship. Does the intercept have a useful interpretation here? Explain. How much higher is the GPA predicted to be if the ACT score is increased by five points?

- (ii) Compute the fitted values and residuals for each observation, and verify that the residuals (approximately) sum to zero.
- (iii) What is the predicted value of GPA when $ACT = 20$?
- (iv) How much variation in GPA for these eight students is explained by ACT? Explain.