

## Econ 312: Empirical Exercise #1

**Question 1.** The following table contains the ACT scores and the GPA (grading 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

1. 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 useful interpretation here? Explain. How much higher is the GPA predicted to be if the ACT score is increased by five points?

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