Name: _____ Student ID: _____

ECON 0150 | MiniExam 4 | Demo

This MiniExam will take 8 minutes with a quick break to follow. MiniExams are designed to both test your knowledge and challenge you to apply familiar concepts in new environments. Treat it as if you're trying to show me that you understand the material. Answer clearly, completely, and concisely.

Academic Conduct Code

The following academic conduct code is designed to protect the integrity of your work. Print your name/initials beside the three academic honesty agreements. I pledge to my fellow students, the university, and the instructor, that:

____ I will complete this MiniExam solely using my own work.
____ I will not use any digital resources unless explicitly allowed by the instructor.
____ I will not communicate directly or indirectly with others during the MiniExam.

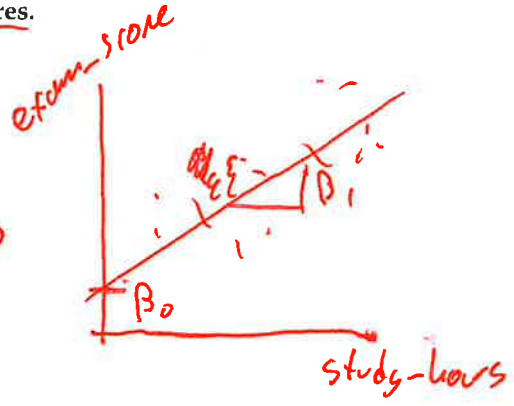
Q1. You have data on student study hours per week (`study_hours`, 0-40) and their final exam scores (`exam_score`, 0-100). You want to test whether students who study more have higher exam scores.

a) Write down a statistical model to test this question.

exam_s = β_0 + β_1 × study + ε

b) Sketch (*to the right* ->) how you would visualize this model.

Done



c) What part of your statistical model would indicate a relationship exists?

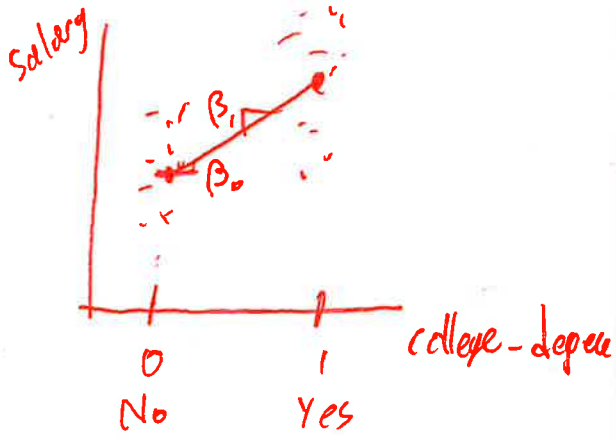
$\beta_1 \neq 0$

Q2. You want to test whether those with a college degree have higher salaries using a dataset with the variables `college_degree` (1 = Yes, 0 = No) and `salary` (in thousands).

a) Write down a statistical model to test this question.

salary = β_0 + β_1 × college_ + ε

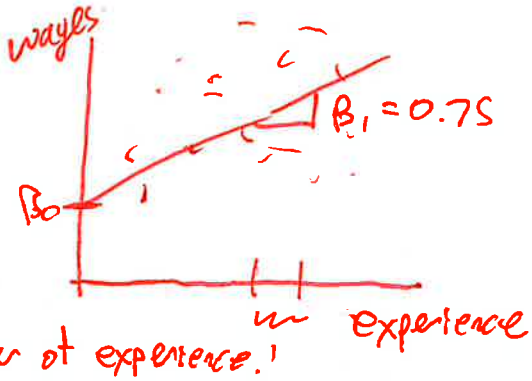
b) Sketch (*to the right* ->) how you would visualize this model.



Q3. A researcher is studying whether those with more years of work experience (`experience`) earn higher hourly wages using a sample with $n = 200$ workers. Their regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	12.500	1.200	10.417	0.000	10.133	14.867
experience	0.750	0.478	1.570	0.120	−0.197	1.697

a) Sketch (*to the right* ->) how you would visualize this model.



b) Interpret the Intercept coefficient (12.50) in context:

Wages for workers with no experience is 12.5.

c) Interpret the coefficient on `experience` (0.75) in context:

Wages increase by 0.75 for every additional year of experience.

Q4. Consider the p-value of 0.120 for the experience coefficient from Q3.

a) Write a complete interpretation of this p-value. What exactly does it tell us?

If there was no relationship between wages and experience, we would see a slope at least this extreme 12% of the time.

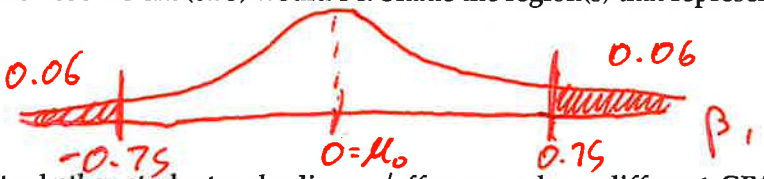
b) Should we reject the null hypothesis that experience has no effect on wages? (Use $\alpha = 0.05$)

□ Yes ☒ No

c) Explain your reasoning for part (b):

Thus, it requires even more confidence than we have: $\alpha < p$.

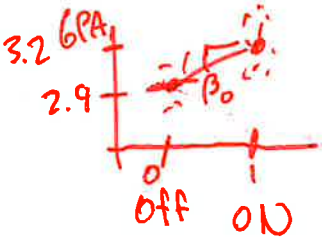
Q5. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for the experience coefficient. Label the axes. Mark where our observed coefficient (0.75) would be. Shade the region(s) that represent the p-value.



Q6. A student wants to test whether students who live on/off campus have different GPA using data from 100 students. Students living on campus have an average GPA of 3.2 and students off campus have an average GPA of 2.9.

a) If we code on_campus as 1 for yes and 0 for no, what would β_0 represent in the model?

The average GPA of off-campus: 2.9



b) What would β_1 equal based on the information given? $\beta_1 =$ 3.2 − 2.9 = 0.3