Name: _____ Student ID: _____

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

_____ = _____ + _____ × _____ + _____

b) Based on the information given, what would β_0 equal? β_0 = _____

c) Based on the information given, what would β_1 equal? β_1 = _____

d) What is the default null hypothesis for β_1? _____

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

_____ = _____ + _____ × _____ + _____

b) What part of your statistical model would indicate that temperature affects sales?

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

Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

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

_____ = _____ + _____ × _____ + _____

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.

b) Interpret the Intercept coefficient (45.20) in context:

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

□ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
□ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
□ Only 0.1% of the income difference between groups is due to random chance
□ There's a 99.9% probability that the true coefficient is at least 18.5
□ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Bailey Michalak Student ID: 4614927

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = B_0 + B_1 × Work location + E

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

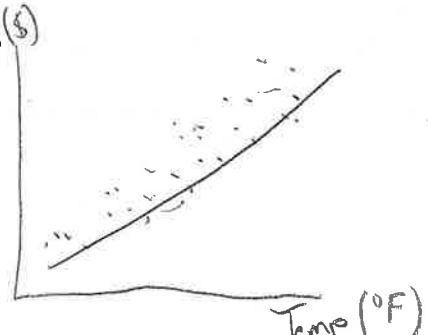
a) Write down a statistical model to test this question.

Ice Cream Sales ($) = B_0 + B_1 × Temperature (°F) + E

b) What part of your statistical model would indicate that temperature affects sales?

The scale for the regression model.

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

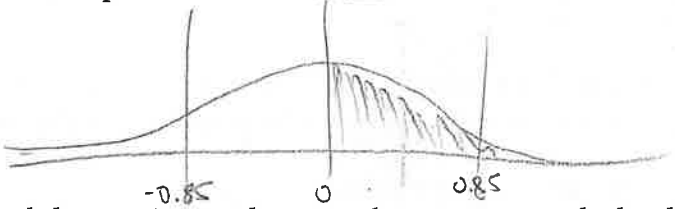
a) Write down a statistical model to test this relationship.

HourlyWages = β_0 + β_1 × Age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

We can determine that there is a relationship between the variables at least 85% of the time.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

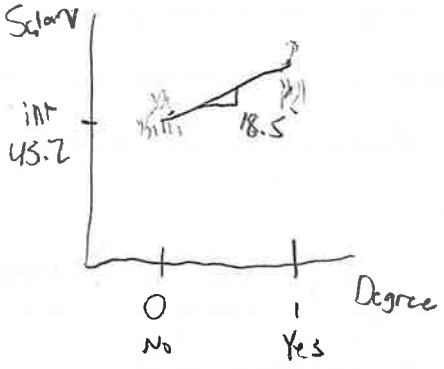


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The salary for not having a degree is $45,200.

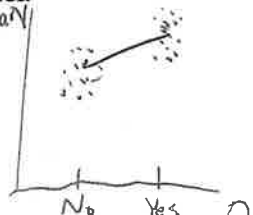
c) Interpret the coefficient on graduate_degree (18.50) in context:

Having a degree can increase wages by 18,500.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

□ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
□ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
□ Only 0.1% of the income difference between groups is due to random chance
☑ There's a 99.9% probability that the true coefficient is at least 18.5
□ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Amina Taivan Student ID: 4782263

ECON 0150 | MiniExam 4 | Fall 2025

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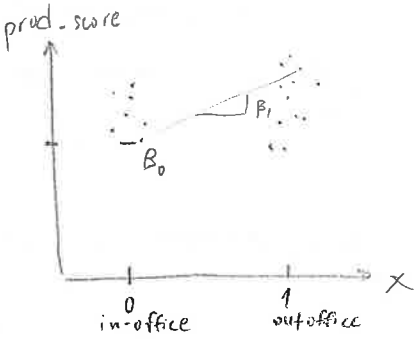
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × office + ε



b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 \neq 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

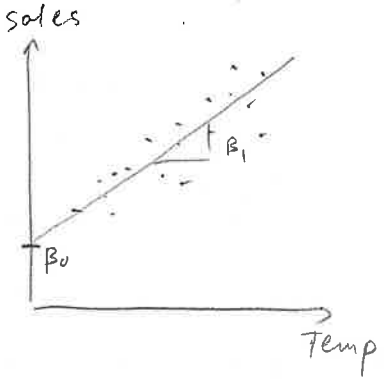
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × Temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 = 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

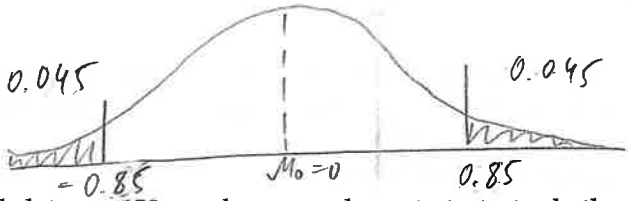
a) Write down a statistical model to test this relationship.

Hourly_wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional year of age

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

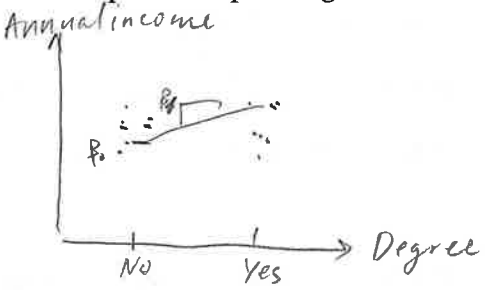


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200 (β_0)	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500 (β_1)	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual income for workers that have a graduate degree is 45.20.

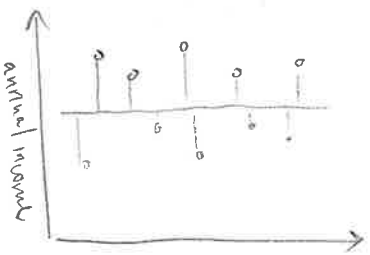
c) Interpret the coefficient on graduate_degree (18.50) in context:

Annual income increase by 18.50 with having a graduate degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Nick Sobolewski Student ID: 4711981

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? β_0 = 78

c) Based on the information given, what would β_1 equal? β_1 = 4 82 − 78 = 4

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

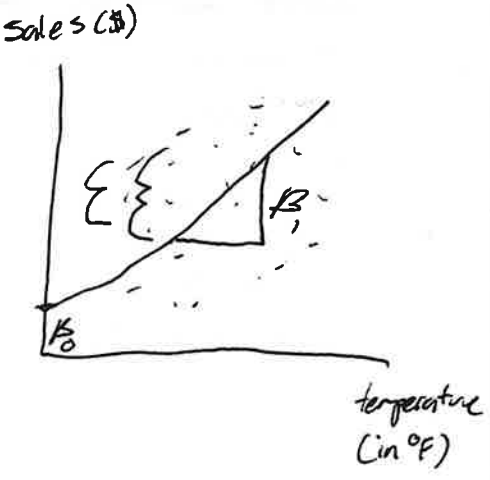
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

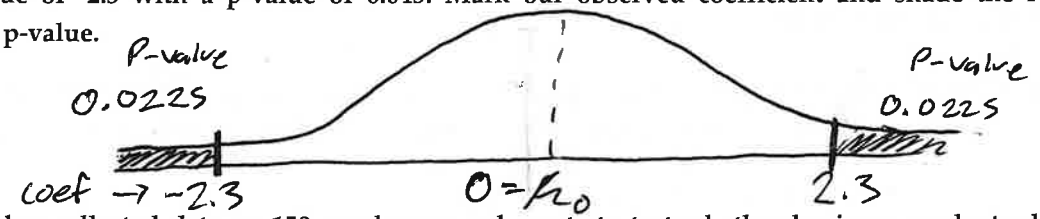
a) Write down a statistical model to test this relationship.

hourly_wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Wages increase by \$0.85 for every additional year of life (age).

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



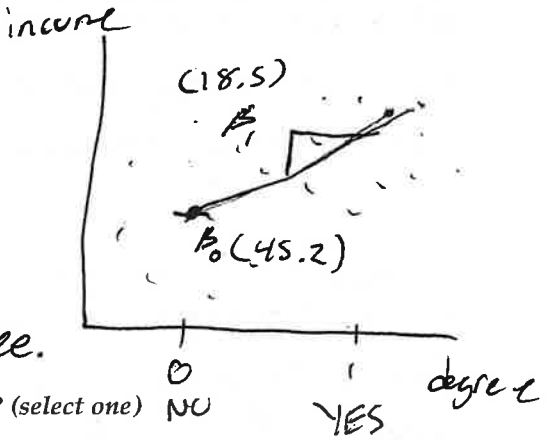
0.0225
0.0225
0.0450

Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

income for those without a degree is 45.20.

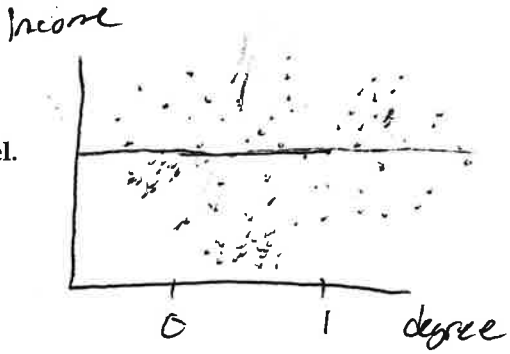
c) Interpret the coefficient on graduate_degree (18.50) in context:

income increases by 18.50 in those w/ a degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Riley Henderson Student ID: 4729387

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a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × 80 + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 82

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

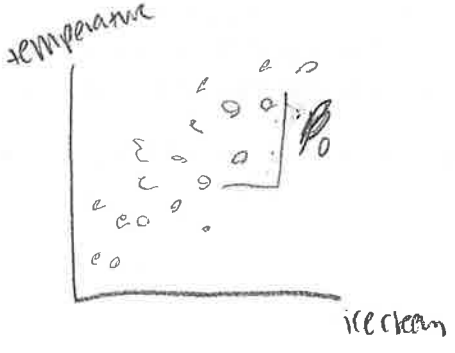
a) Write down a statistical model to test this question.

Ice Cream Sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_0

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

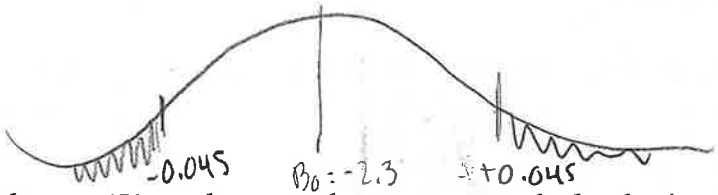
a) Write down a statistical model to test this relationship.

hourly wage = β_0 + β_1 × 250 + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

the y intercept is 0.85 for hourly wage

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

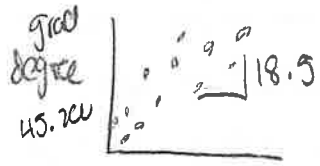


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

the y intercept is 45.20 for grad degree

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

slope; for every additional unit of x you get 18.50 unit of y

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☒ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
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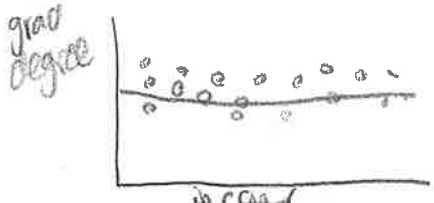
e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Medha Pendota Student ID: 4722507

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a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

$score_j = \beta_0 + \beta_1 \times productivity + \varepsilon$

b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = 78$

d) What is the default null hypothesis for β_1? fail to reject

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

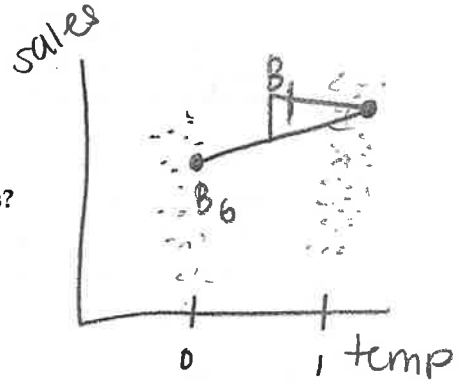
a) Write down a statistical model to test this question.

$sales = \beta_0 + \beta_1 \times temp + \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

$\beta \neq 0$

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



No Yes

Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

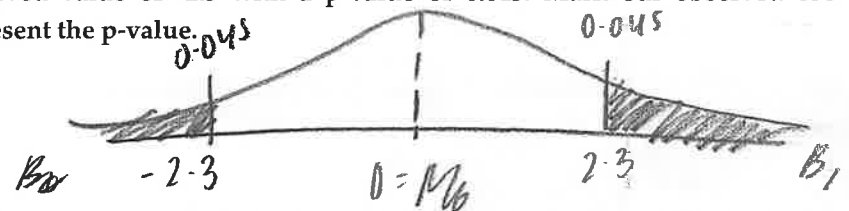
a) Write down a statistical model to test this relationship.

wage = β_0 + β_1 × hour + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Represents the slope of the graph

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

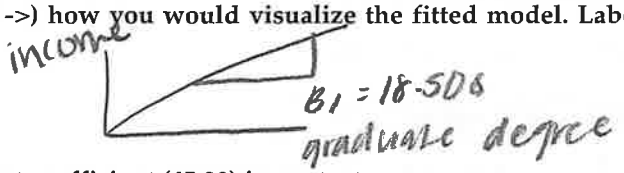


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

the income of workers with zero degree

c) Interpret the coefficient on graduate_degree (18.50) in context:

shows that income increase, by 18.50 for every additional college degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☒ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Isha Nathan Student ID: 4641651

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity score = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 \neq 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

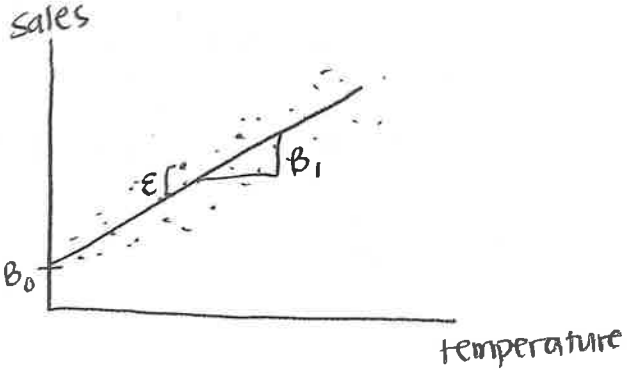
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

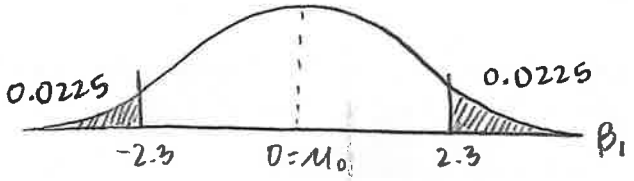
a) Write down a statistical model to test this relationship.

hourly-wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

hourly wages increase by 0.85 for every 1 year increase in age

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

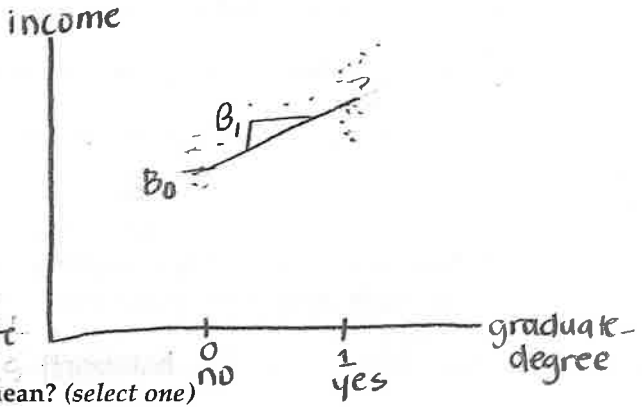


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average income for no graduate degree is 45.2 thousand dollars

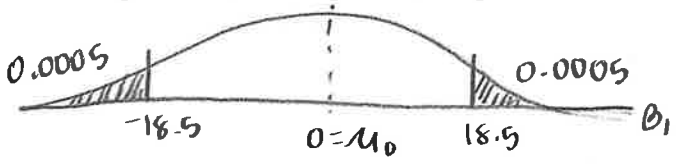
c) Interpret the coefficient on `graduate_degree` (18.50) in context:

the difference between average income for workers with and without a graduate degree is 18.5 thousand dollars

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Juan Fernandez Student ID: 4640249

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × workers + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

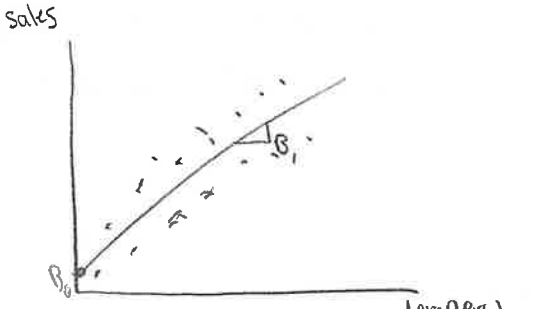
a) Write down a statistical model to test this question.

ice cream sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

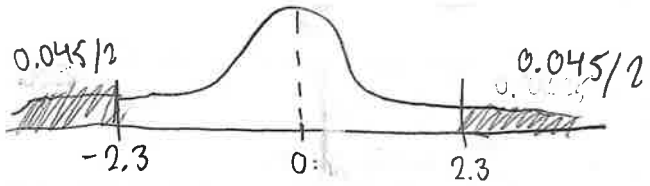
a) Write down a statistical model to test this relationship.

hourly wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every additional age (year), wage increases by 0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

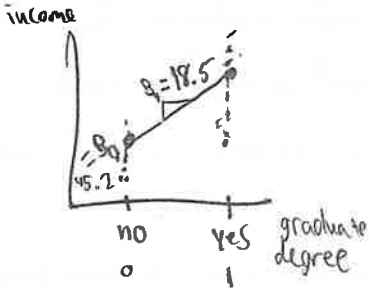


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

annual income on average for employees without a degree is 45.2

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

the slope of our line, having a degree increases the average annual salary by 18.5

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☒ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☒ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☒ There's a 99.9% probability that the true coefficient is at least 18.5
- ☒ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Max Irish Student ID: 4618211

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity score = B_0 + B_1 × In or out of office + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ ~~82~~

d) What is the default null hypothesis for β_1? ~~$B_1 = 0$~~ $B_1 \neq 0$

B_0 = out of office = 1
B_1 = ~~in office~~
82 − 78 = 4

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

Ice Cream Sales = B_0 + B_1 × Temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

$B_1 \neq 0$, so a statiscally significant $\hat{B}$ indicates a relationship.

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

Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

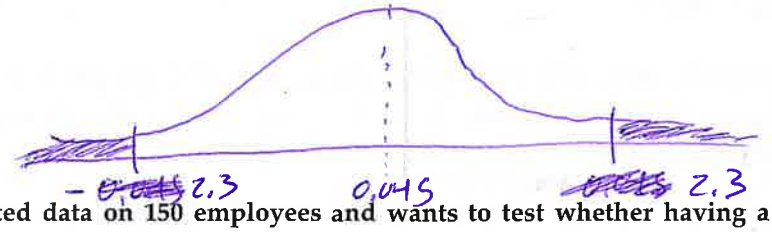
a) Write down a statistical model to test this relationship.

Hourly wages = β_1 + β_0 × Age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages go up 0.85$ per additional year in age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

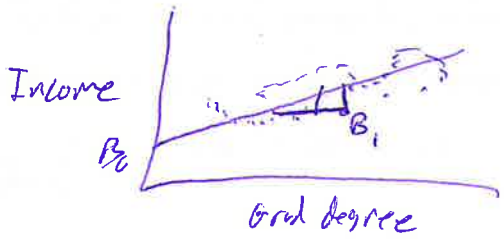


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Wages for workers with no experience is equal to 45.20$.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

Wages increase 18.50$ if you have an additional graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
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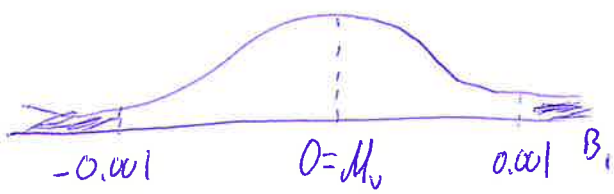
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Christian Wieczenski Student ID: 4624229

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity Score = B_0 + B_1 × in or at office + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$ B_0 - out of office

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$ 82 - 78

d) What is the default null hypothesis for β_1? $B_1 \neq 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

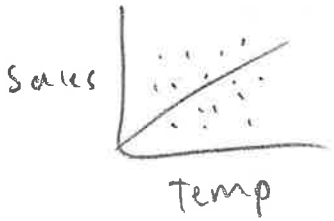
a) Write down a statistical model to test this question.

Income Sales = B_0 + B_1 × temperature ε

b) What part of your statistical model would indicate that temperature affects sales?

$B \neq 0$ is statistically significant $\widetilde{B}$ indicates a relationship

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

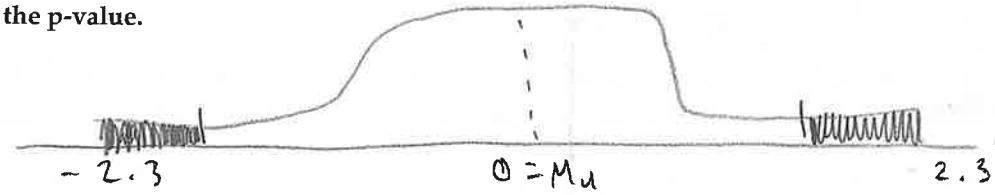
a) Write down a statistical model to test this relationship.

hourly wages = B_1 + B_0 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages go up each additional year in age

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

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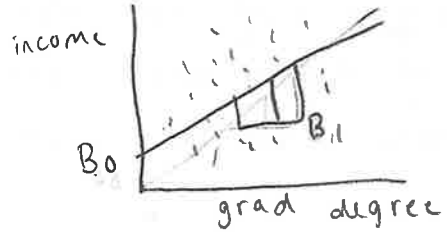
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

wages for workers with no experience expand to 45.20.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

wages increase 18.50 if workers have an additional graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Mirabelle Schiller Student ID: 4652946

ECON 0150 | MiniExam 4 | Fall 2025

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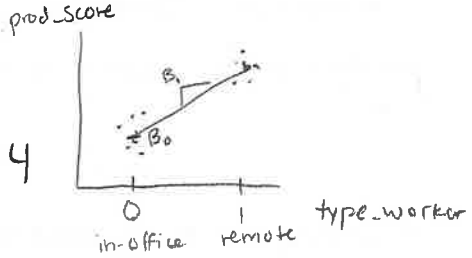
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

prod_score = β_0 + β_1 × type_worker + ε



b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78 = 4$

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

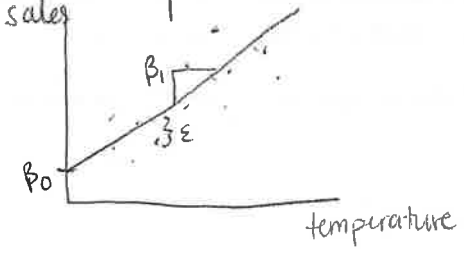
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 (the slope) would indicate that temp affects sales.

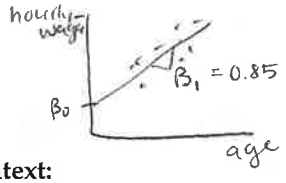
c) Sketch (*to the right* ->) how you would visualize this model.



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

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

hourly_wages = β_0 + β_1 × age + ε



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional year of age

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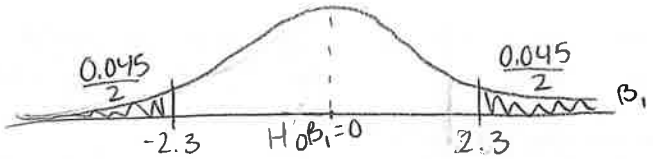

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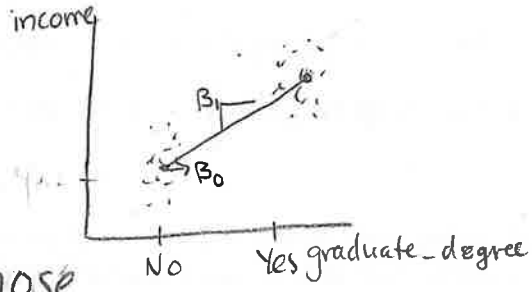
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Income for employees with no degree is $45,200.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

Avg Income increases by $18,500 for those with a college degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Rylie Teets Student ID: 4720986

ECON 0150 | MiniExam 4 | Fall 2025

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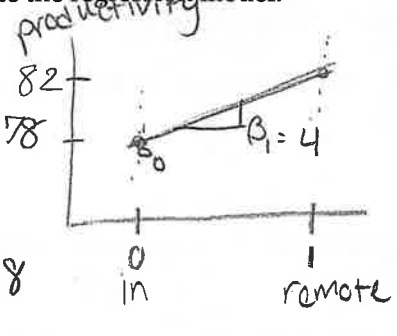
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote + ε



b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 4

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

82 − 78 = 4

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

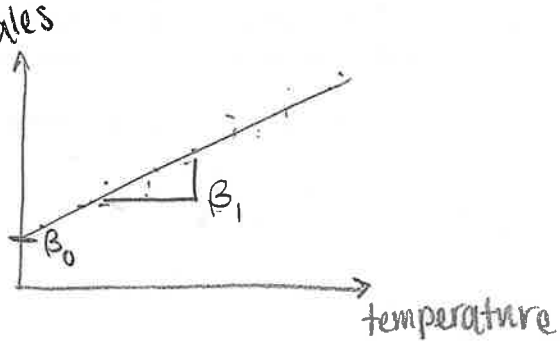
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$, would be > 0 in this case

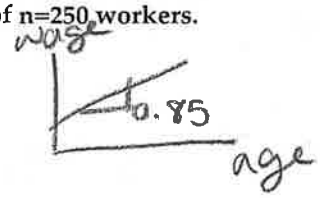
c) Sketch (*to the right* ->) how you would visualize this model.



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

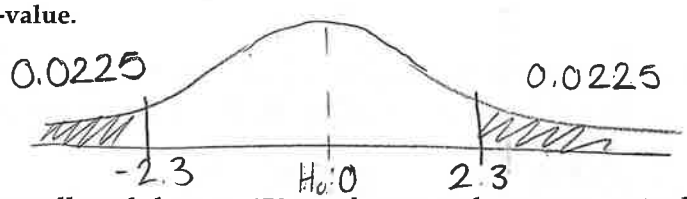
$\text{Wage} = \beta_0 + \beta_1 \times \text{age} + E$



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

As age increases by 1 year, we can expect wage to increase by 0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

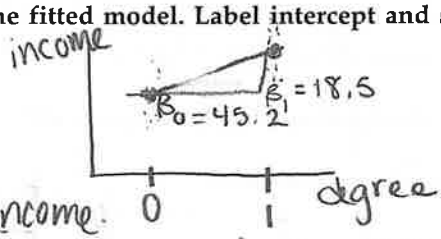


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

We can expect the annual income of an employee without a graduate degree to be $45,200

c) Interpret the coefficient on graduate_degree (18.50) in context:

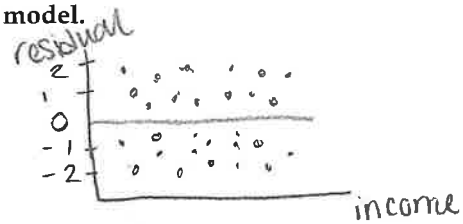
When an employee gets there graduate degree we can expect there anual income to increase by $18,500

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

□ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
□ Only 0.1% of the income difference between groups is due to random chance
□ There's a 99.9% probability that the true coefficient is at least 18.5
□ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

(residuals aren't larger or smaller for certain values)



Name: Connor McCollick Student ID: 4551099

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

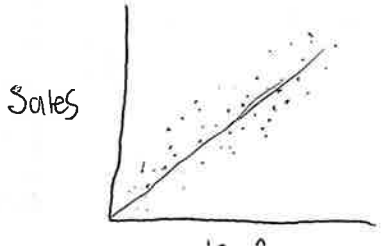
a) Write down a statistical model to test this question.

Sales = β_0 + temperature × β_1 + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

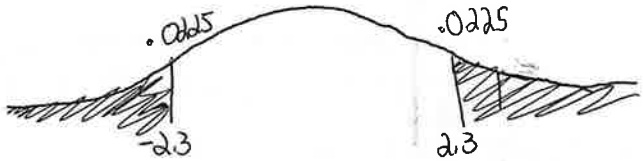
a) Write down a statistical model to test this relationship.

Hourly wages = B_0 + age × B_1 + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every one unit of increase in age, there is a $0.85 increase in ~~wages~~ average wages

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

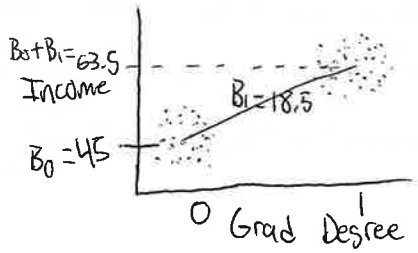


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average annual income for someone without a graduate degree is $45,200

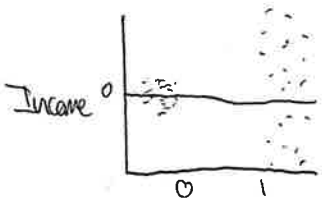
c) Interpret the coefficient on graduate_degree (18.50) in context:

The ~~[illegible]~~ difference in income between the average non graduate degree holder and graduate degree holder is $18,500. (Grad degree holders make $18,500 more on average than non-holders

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Joe Lis Student ID: 4565604 / jol165

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

remote = β_0 + β_1 × in-office + ε

b) Based on the information given, what would β_0 equal? β_0 = in-office score

c) Based on the information given, what would β_1 equal? β_1 = remote score

d) What is the default null hypothesis for β_1? H_0: $\beta_1 = 0$ no difference in prod. score between remote / in-office

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

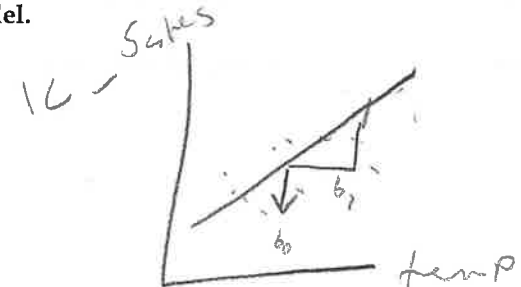
a) Write down a statistical model to test this question.

IC_Sales = b_0 + b_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

the coefficient of b_1

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

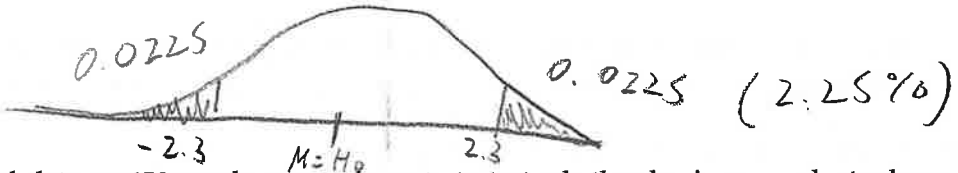
a) Write down a statistical model to test this relationship.

hourly_wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

for every year older, hourly wage increases by 0.85.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

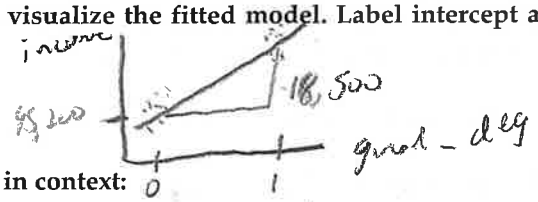


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

annual income for someone w/o a graduate degree is $45,200 on average

c) Interpret the coefficient on graduate_degree (18.50) in context:

annual income for someone w/ a grad degree increases salary by $18,500 on average

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
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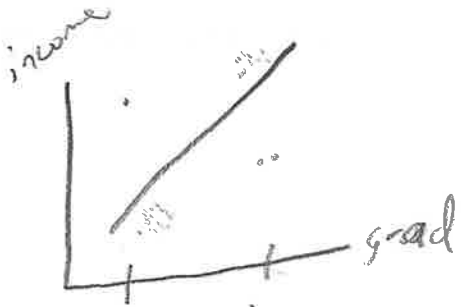
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Coco Reed Student ID: 453/679

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity β_0 + β_1 remote × β_0 office + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = 78$

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$ or 78 here

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

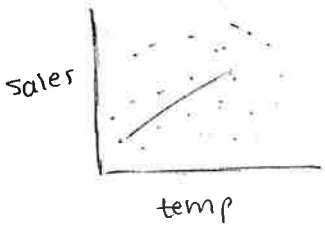
a) Write down a statistical model to test this question.

$sales^{(\$)} = \beta_0 + \beta_1 \times temp(°F) + \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

β_1, because that is the slope coefficient and tells us if temp has positive or negative affect on sales

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



(i actually read once that ice cream sales go up as temp drops in some places!)

Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

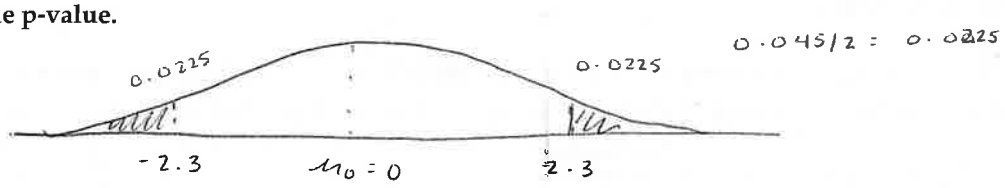
a) Write down a statistical model to test this relationship.

wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

this represents the difference between groups (ages)
(rise/fall)

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



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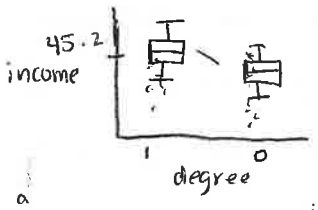
	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

assuming the subject does not have a graduate degree, they will make an average of 45.200 income per year

c) Interpret the coefficient on graduate_degree (18.50) in context:

this shows a positive relationship, the predicted change in anual income will increase by 18.50 on average for everyone with a graduate degree

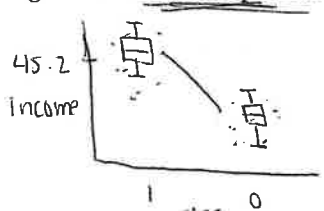
d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

liklihood of seeing an increase of 0.001 if the null is true

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

increasing variability



Name: Megan Suess Student ID: 4331770

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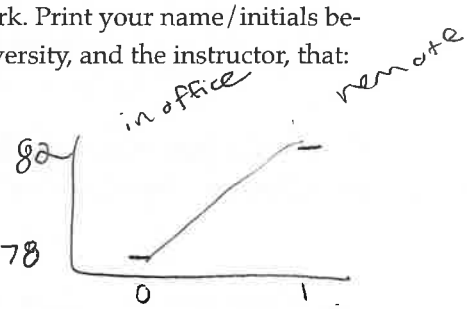


Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

remote prod. = β_0 + β_1 × in office prod. + ε

82 − 78 = 4

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

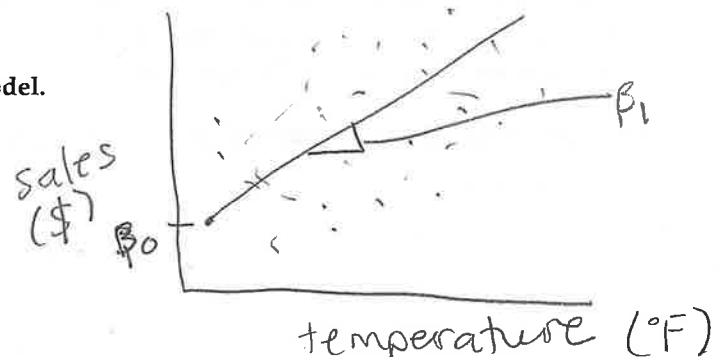
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

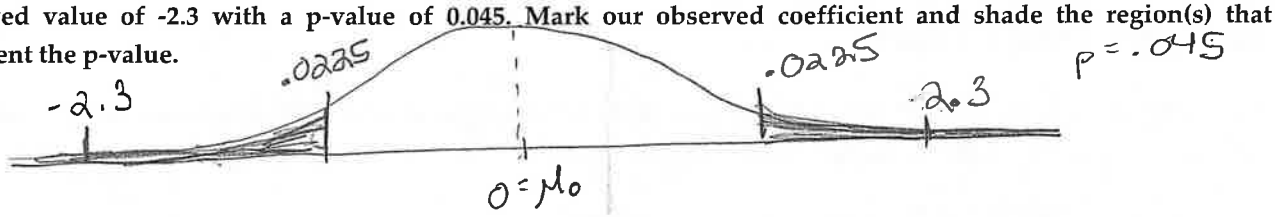
a) Write down a statistical model to test this relationship.

wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

for each year older a person is, they are likely to have a .85 increase in wage.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

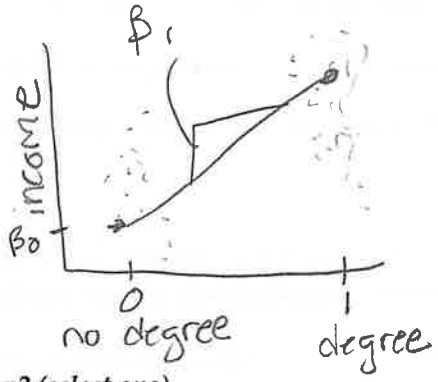


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

that is the avg. income for someone without a graduate degree

c) Interpret the coefficient on graduate_degree (18.50) in context:

the likely increase in income for someone who has a graduate degree

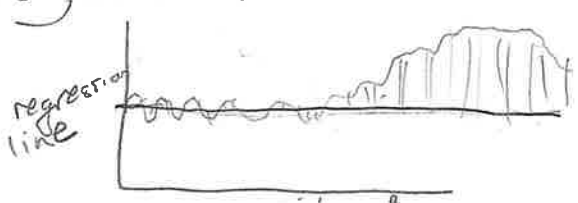
d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

p is low → null must go → reject null

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

means there is an uneven distribution of error in the model



Name: Julius Kotcher Student ID: 48869944

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

82 78

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × work location + ϵ

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 4

82 − 78 = 4

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

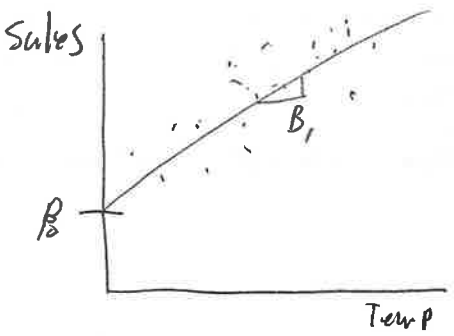
Sales = β_0 + β_1 × Temp. + ϵ

b) What part of your statistical model would indicate that temperature affects sales?

β_1, or the slope

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

Yes →



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

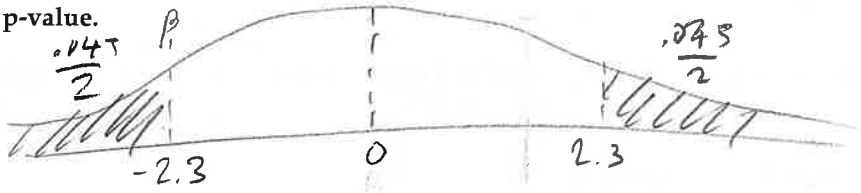
a) Write down a statistical model to test this relationship.

hourly wages = β_0 + β_1 × Age + ϵ

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Workers wages increase by $.85 for each year of age they have. are expected to

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

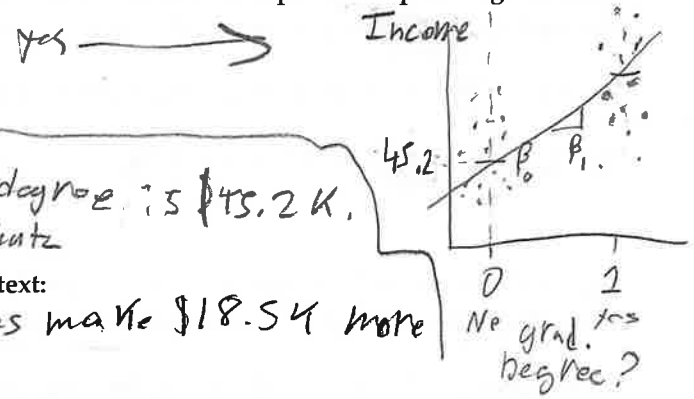


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average annual income of people with no graduate degree is $45.2K.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

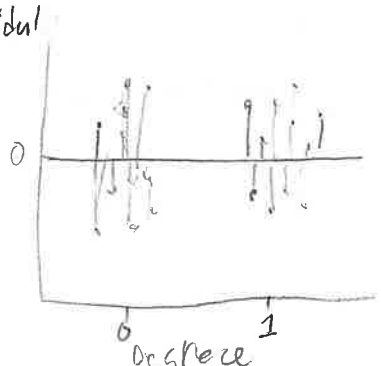
On average, people with graduate degrees make $18.54 more than those without.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

#2!

- [ ] Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- [x] If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- [ ] Only 0.1% of the income difference between groups is due to random chance
- [ ] There's a 99.9% probability that the true coefficient is at least 18.5
- [ ] The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Alyssa Bisram Student ID: 4565158

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

remote = β_0 + β_1 × office + ε

b) Based on the information given, what would β_0 equal? β_0 = intercept (Y when x=0)

c) Based on the information given, what would β_1 equal? β_1 = slope (change in y per unit change in x)

d) What is the default null hypothesis for β_1? $\beta_1 \neq 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

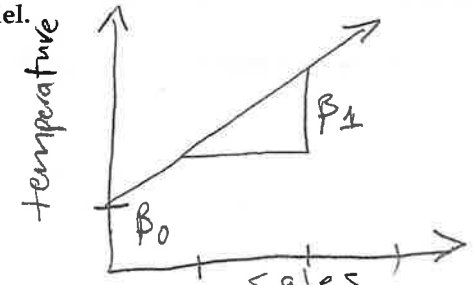
sales = β_0 + β_1 × temp. + ε

b) What part of your statistical model would indicate that temperature affects sales?

the (β_1 × temperature) part bc the temp. would affect the slope of the equation

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

↪



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

$\text{hourlywages} = \beta_0 + \beta_1 \times \text{age} + \varepsilon$

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages will increase by 0.85 dollars for every increase in age by year.

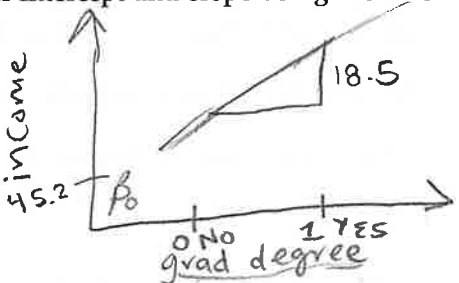
Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

This would represent approximate/average income with NO graduate degree.

c) Interpret the coefficient on graduate_degree (18.50) in context:

For each additional part of degree pursued / length of time after having earned degree, annual income will increase by 18.50 dollars.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

← unequal error variance across all values of X!

Name: Chase Charles Student ID: 4681746

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = B_0 + B_1 × #ofdaysin + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 4 82-78

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

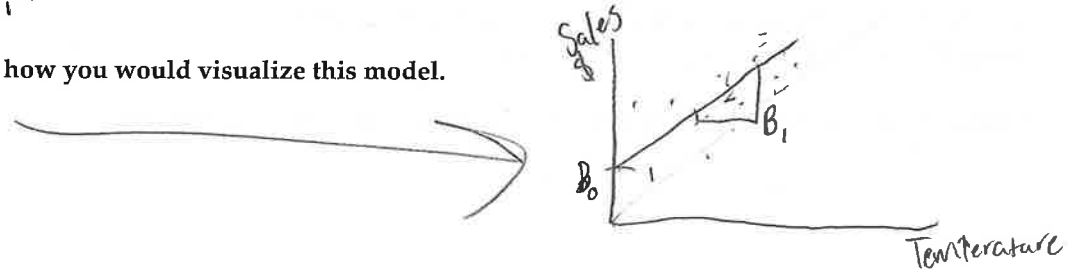
a) Write down a statistical model to test this question.

Sales = B_0 + B_1 × Temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

$B_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

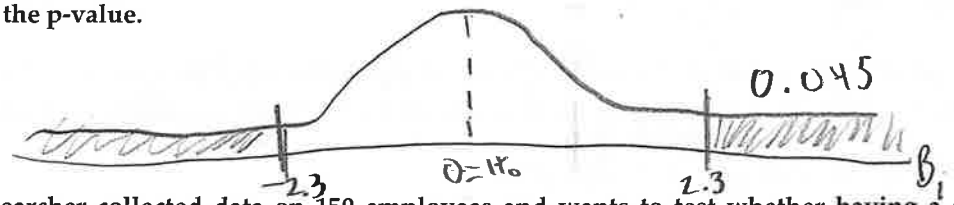
a) Write down a statistical model to test this relationship.

Wages = β_0 + β_1 × age + ε_i

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

This would mean that wages increase by 0.85 for every year

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

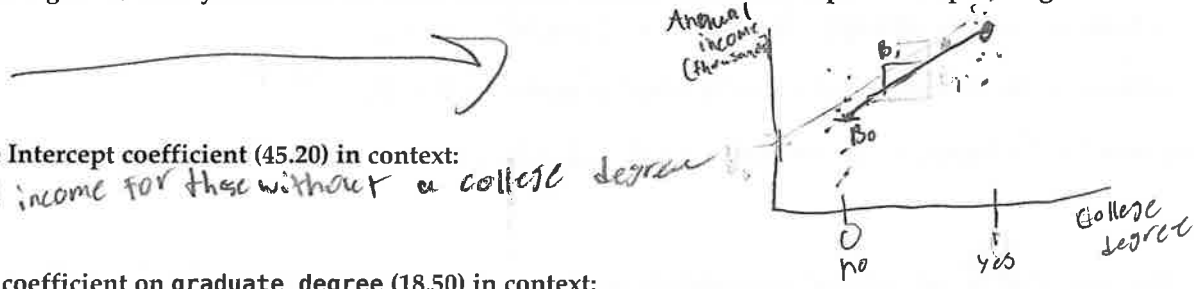


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual income for those without a college degree

c) Interpret the coefficient on graduate_degree (18.50) in context:

Annual income increased by 18,500 thousand with a college degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☒ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Mike Brodecki Student ID: 46391111

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

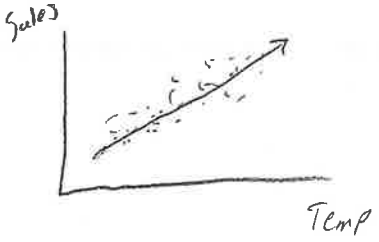
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × Temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 as the predictor variable, coefficient value affects sales depending on temp

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

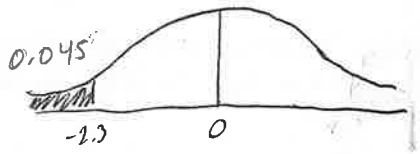
a) Write down a statistical model to test this relationship.

wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every additional unit of age, our hourly wage increases by 0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

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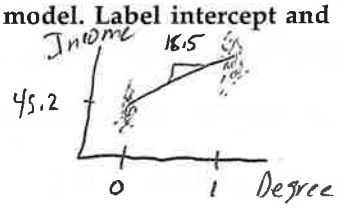
Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

For any employee without a degree, their average income will be $45,200

c) Interpret the coefficient on graduate_degree (18.50) in context:

For any employee with a degree, their average income is $18,500 higher than without

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ■ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Asliddin Nurboev Student ID: 4571391

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a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + remote × β_1 + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

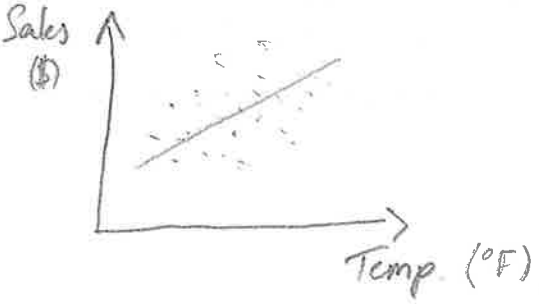
a) Write down a statistical model to test this question.

sales = β_0 + temperature × β_1 + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 would be the indicator

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

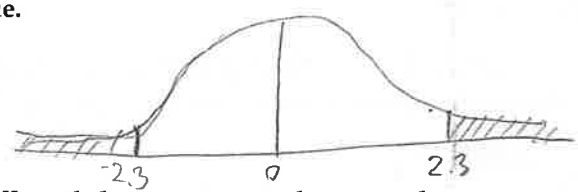
a) Write down a statistical model to test this relationship.

Wage = β_0 + age × β_1 + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

There is an association in → Hourly wage increases by 0.85 cents, for every extra years of age of employee.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



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graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.

b) Interpret the Intercept coefficient (45.20) in context:

Average income of employee without a degree is 45,2 k a years.
graduate

c) Interpret the coefficient on graduate_degree (18.50) in context:

Employees with degree earns 18.5k more yearly on average, compared to employees without degree.
graduate graduate

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? (*select one*)

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
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- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Charley Wan Student ID: 4616524

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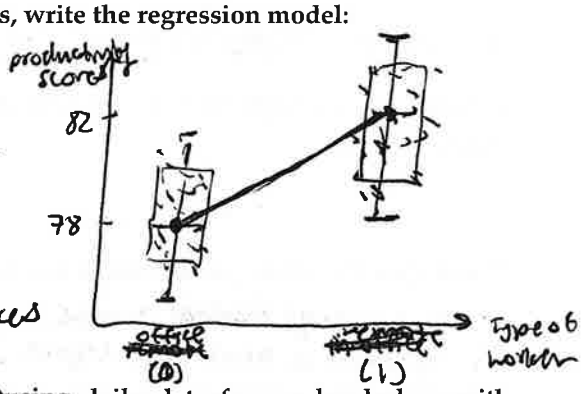
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity scores = β_0 + β_1 × Type of worker + ε_i



b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

There's no difference in productivity scores btw office workers and remote workers

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

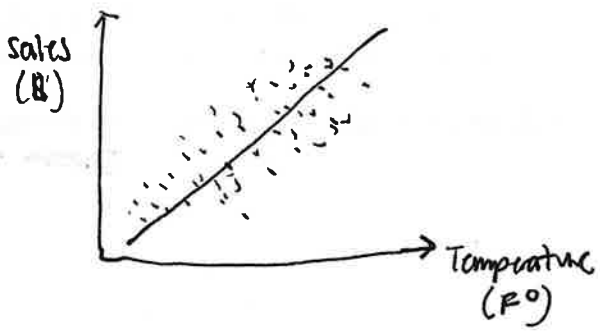
a) Write down a statistical model to test this question.

sales ($) = β_0 + β_1 × temperature (F°) + ε_i

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

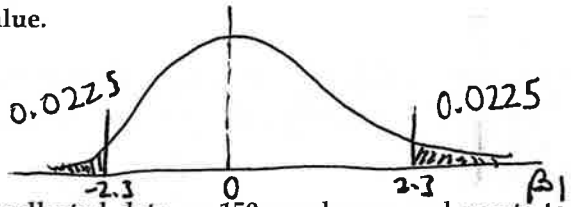
a) Write down a statistical model to test this relationship.

hourly_wages = β_0 + β_1 × age + ε_i

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every 1 year increase in age, there is a $0.85 increase in the worker's hourly wage

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



0.0225
2) 0.045
0
04
0
04

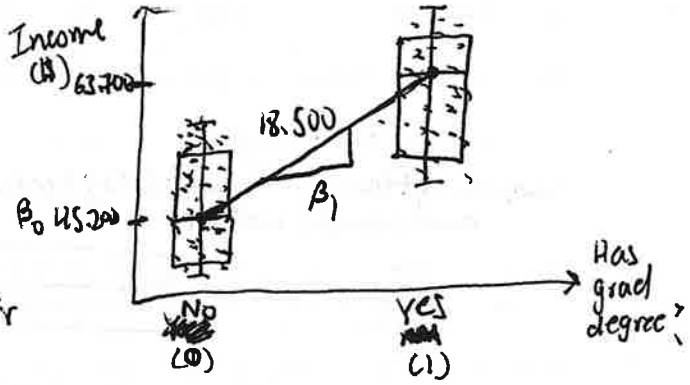
Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

63.700

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average annual income of a student without a graduate degree is $45,200

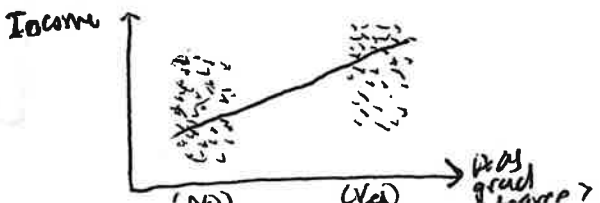
c) Interpret the coefficient on graduate_degree (18.50) in context:

If an employee has a graduate degree, their average annual income increases by $18,500

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- □ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- □ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☒ Only 0.1% of the income difference between groups is due to random chance
- □ There's a 99.9% probability that the true coefficient is at least 18.5
- □ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Makayla Yee Student ID: 4906956

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

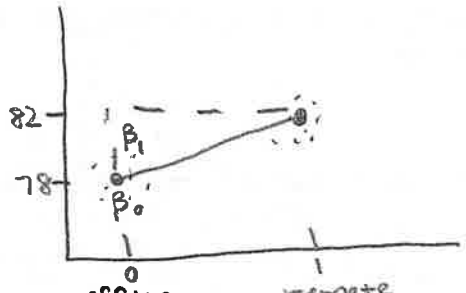
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$



Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

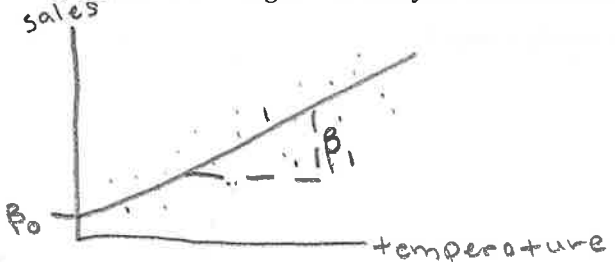
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temp. + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

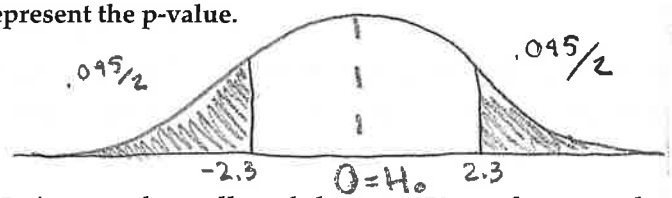
a) Write down a statistical model to test this relationship.

hourly wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Wages increase by .85 for each additional year in age (assuming age is being measured in years)

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

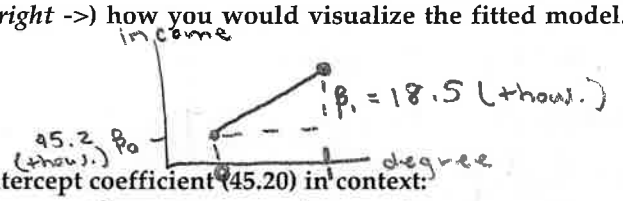


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The salary for employees without a graduate degree is $45,200.

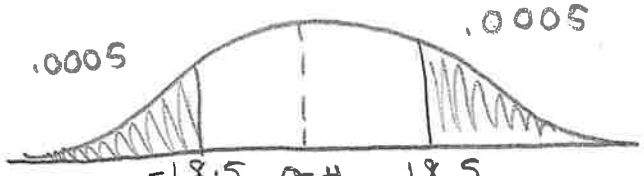
c) Interpret the coefficient on graduate_degree (18.50) in context:

Salary increases by $18,500 when a graduate degree is obtained.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

□ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
□ Only 0.1% of the income difference between groups is due to random chance
□ There's a 99.9% probability that the true coefficient is at least 18.5
□ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Shin Thant Wadi Aung Student ID: 4699806

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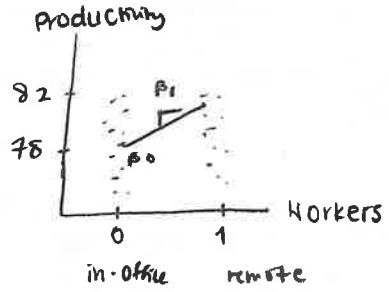
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × Workers + ε



b) Based on the information given, what would β_0 equal? β_0 = 78

c) Based on the information given, what would β_1 equal? β_1 = 82 − 78 = 4

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

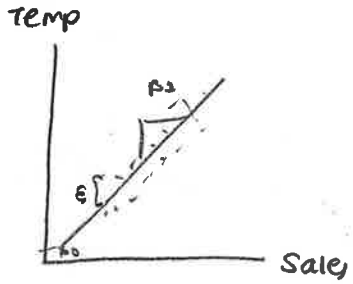
a) Write down a statistical model to test this question.

Temperature = β_0 + β_1 × Sales + ε

b) What part of your statistical model would indicate that temperature affects sales?

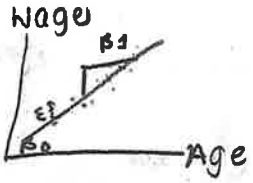
$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

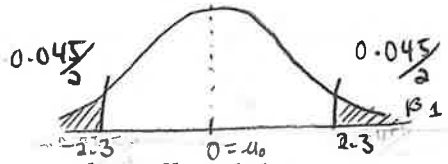


Hourly Wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional increase in age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



p-value = 0.045 (0.045/2 , 0.045/2)

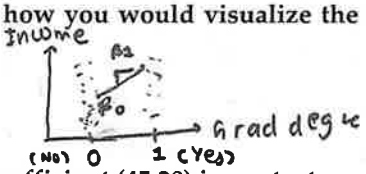
Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

→ Income = $\beta_0 + \beta_1 \times$ (grad degree) + ε

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual income with no graduate degree is 45.20.

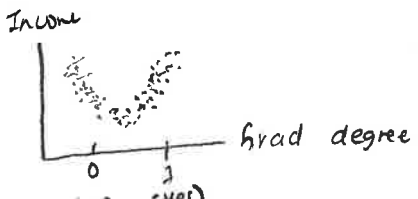
c) Interpret the coefficient on graduate_degree (18.50) in context:

Annual income increase by 18.5 with additional graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☒ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: David Hargraves Student ID: 4618322

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

1 = β_0 + β_1 × 0 + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = -78$

d) What is the default null hypothesis for β_1? $\beta_1 \neq \beta_0$

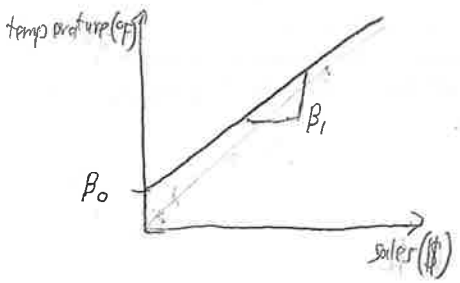
Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

°F = β_0 + β_1 × $ + ε

b) What part of your statistical model would indicate that temperature affects sales?

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



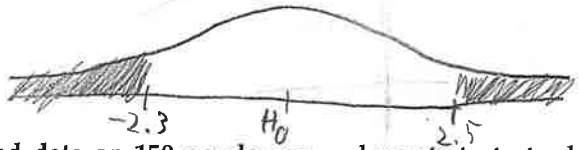
Q3. You want to examine whether age predicts `hourly_wages` using a sample of n=250 workers.

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

hourly_wages = β_0 + β_1 × 250 + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

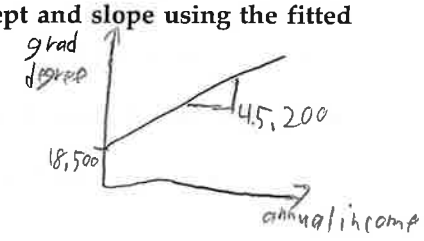


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

If graduate degrees do not affect annual income, slopes will be 45.2 degrees or higher.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

18.5% of the employees have graduate degrees

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
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- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Ethan Gatgen Student ID: 45433337

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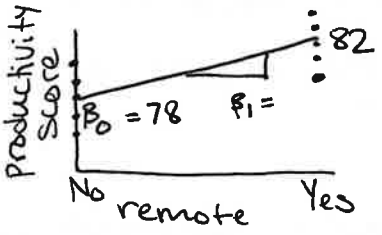
a) If we code remote as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity score = β_0 + β_1 × remote + ε



b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

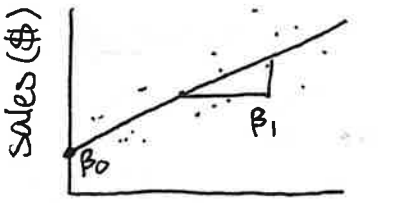
c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables temperature (in °F) and sales (in dollars).

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

sales = β_0 + β_1 × temperature + ε



b) What part of your statistical model would indicate that temperature affects sales?

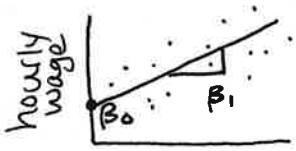
if $\beta_1 \neq 0$, that suggests a relationship between temperature & sales

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

Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

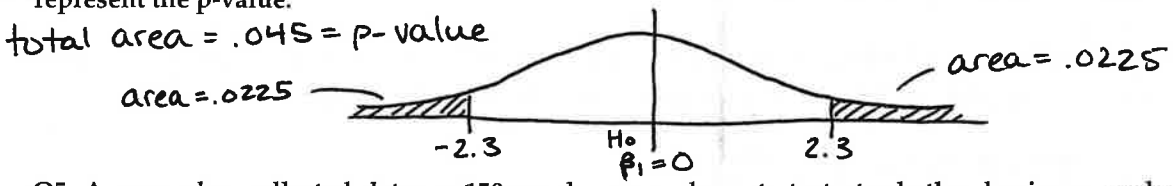
hourly_wages = β_0 + β_1 × age + ε



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For each unit increase in age (perhaps each year increase in age), hourly wages increase by .85 (perhaps $0.85).

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

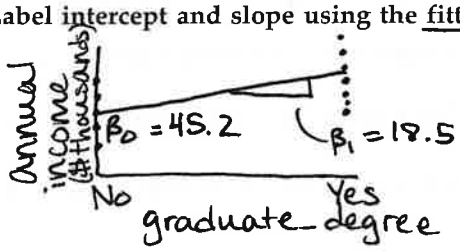


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average annual income of employees without a graduate degree is $45,200.

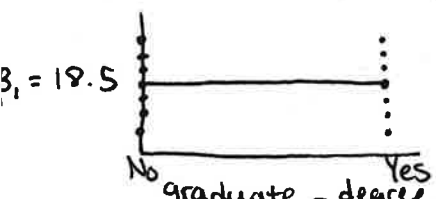
c) Interpret the coefficient on graduate_degree (18.50) in context:

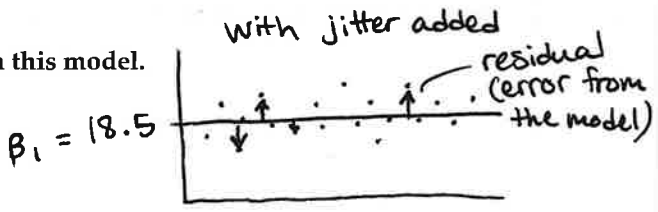
Having a graduate degree means your income will be $18,500 more than an employee without a graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- □ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- → ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- □ Only 0.1% of the income difference between groups is due to random chance
- □ There's a 99.9% probability that the true coefficient is at least 18.5
- □ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.





Name: JJ Sensibar Student ID: 4860646

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = 78 = β_0 + $\beta_1 = 4$ × location + ε location = in office vs. remote

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

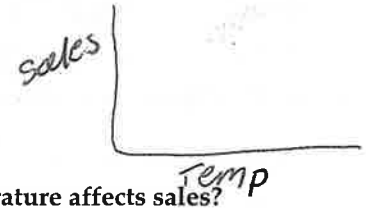
c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

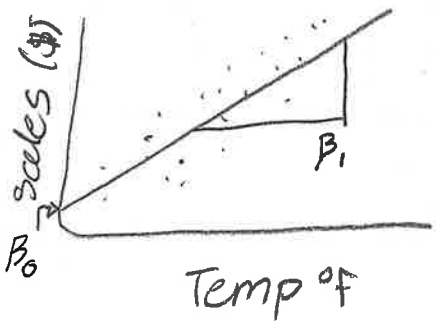
sales = β_0 + β_1 × Temp + ε



b) What part of your statistical model would indicate that temperature affects sales?

if $\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

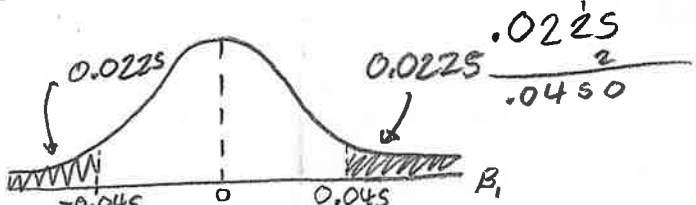
a) Write down a statistical model to test this relationship.

hourly wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For each additional year of age, wage increases an average of 0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

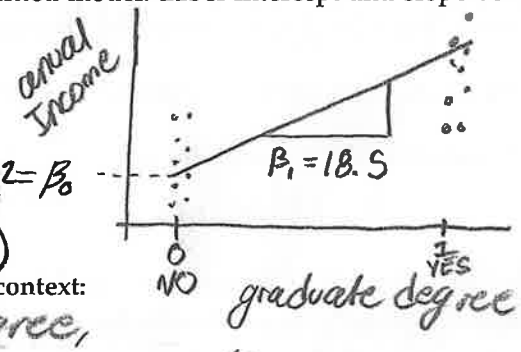


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept No Degree	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, (0 = No) income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context: 45.2 = β_0

Those without a graduate degree have yearly income of 45.2 (I hope K)

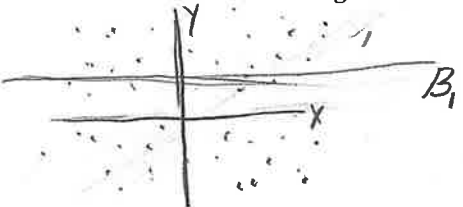
c) Interpret the coefficient on graduate_degree (18.50) in context:

Moving from No to Yes graduate degree, the average increase in anual income is 18.5 (Again I hope K)

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- □ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☒ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- □ Only 0.1% of the income difference between groups is due to random chance
- □ There's a 99.9% probability that the true coefficient is at least 18.5
- □ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Equal variance in errors on either side of trend, No uniform/systematic error

Name: Marlaina Wakim Student ID: 45655 99

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity $= \beta_0 + \beta_1 \times$ workers $+ \varepsilon$

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

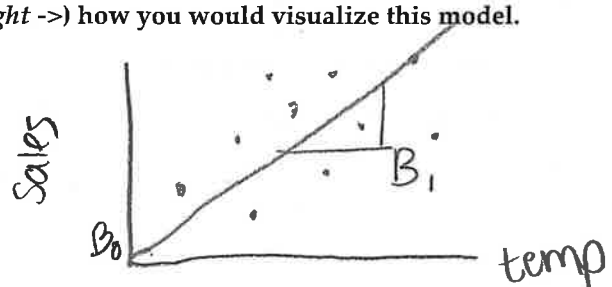
a) Write down a statistical model to test this question.

sales $= \beta_0 + \beta_1 \times$ temp $+ \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

β_1 (slope)

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

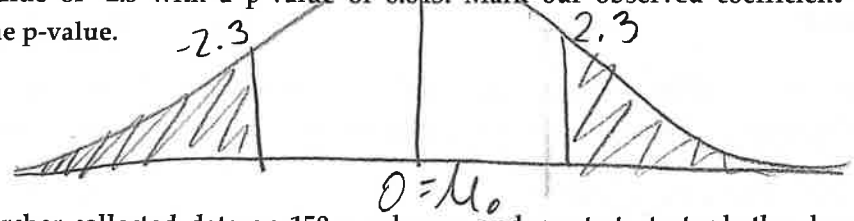
a) Write down a statistical model to test this relationship.

hourly wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

hourly wage goes up by 0.85 for every year older you get

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

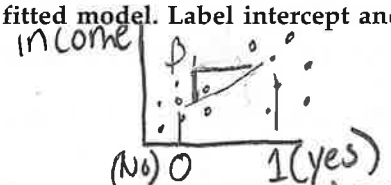


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Starting annual income at least @ 45.20 (thousand?)

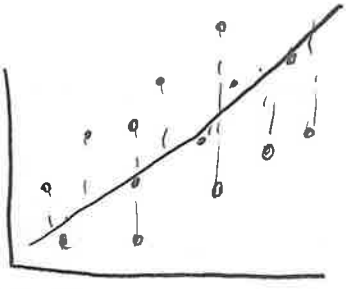
c) Interpret the coefficient on graduate_degree (18.50) in context:

annual income goes up by (18.50) thousand if you have a grad degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☒ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



variance of errors is constant across X

Name: Emily Nguyen Student ID: 4589082

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

$82 = 78 + \beta_1(1)$
$\beta_1 = 82 - 78 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

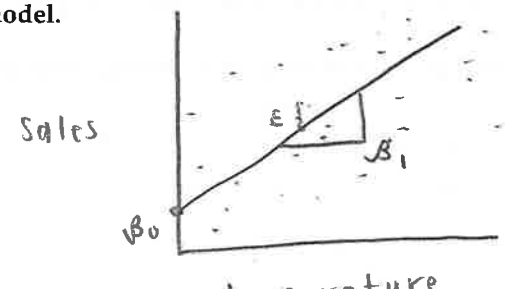
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 determines whether temp. affects sales
$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

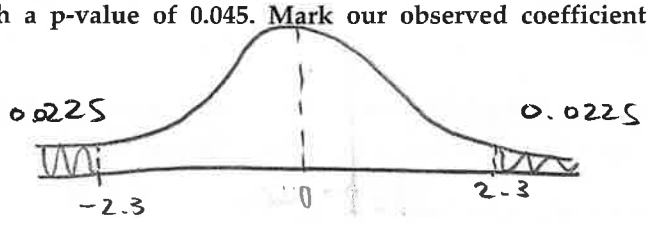
hourly_wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 with each additional year of age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

0.0229
2 | 0.045
-40
5 0



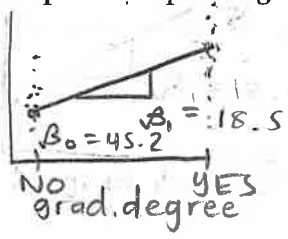
Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.

annual income



b) Interpret the Intercept coefficient (45.20) in context:

β_0 is the average annual income for people without a graduate degree. ($45,200)

c) Interpret the coefficient on graduate_degree (18.50) in context:

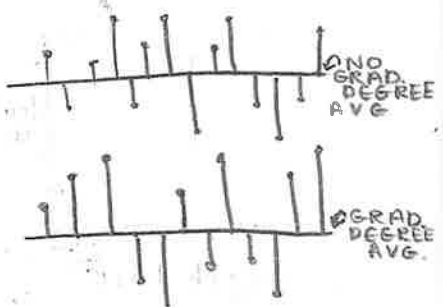
People with a graduate degree make about $18500 more a year than people without a grad. degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☑ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance ✗
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5 ✗
- ☐ The coefficient of 18.5 has a 0.1% margin of error ✗

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

↳ unequal error variance across values of X



Name: Jhanvi Sharma Student ID: 461 4120

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78. B1 80

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = B0 78 + B1 82 × remote + E

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 82

d) What is the default null hypothesis for β_1? = 0

There is no relationship between remote or in office work with productivity levels

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

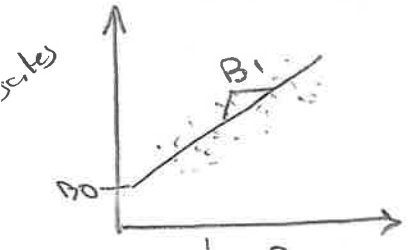
a) Write down a statistical model to test this question.

Sales = B0 + B1 × temp + E

b) What part of your statistical model would indicate that temperature affects sales?

B1 shows the relationship between the variables

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

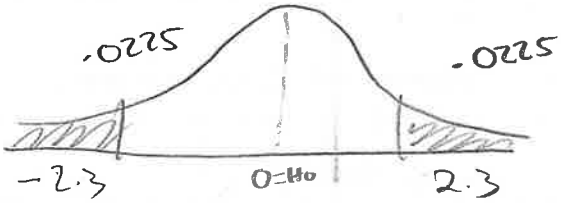
a) Write down a statistical model to test this relationship.

wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Per every one unit increase in age, there is about a 0.85 % increase in wage

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

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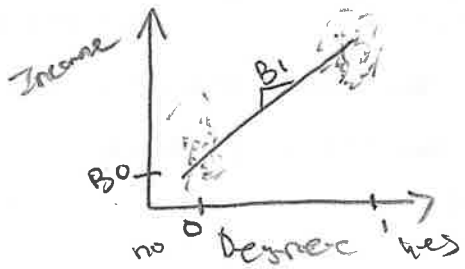
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

If you had 0 degrees, the annual income would be 45.20

c) Interpret the coefficient on graduate_degree (18.50) in context:

Per each degree you get, the income increases by 18.50

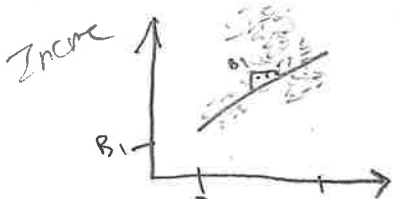
d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

P < .05
reject the Ho, significant evidence of relationship

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

non constent variance



Name: Sophia Chebli Student ID: 46412360

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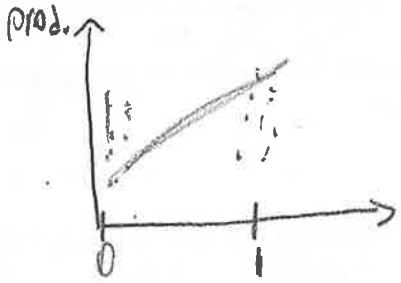
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × Worker + ε



b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

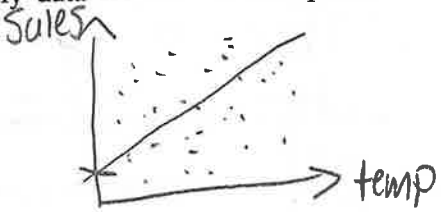
c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? $\beta_1 = 4$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

Sales = β_0 + β_1 × temp. + ε



b) What part of your statistical model would indicate that temperature affects sales?

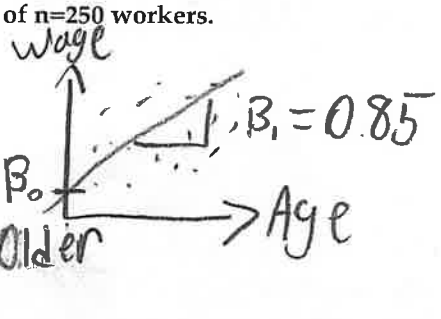
$\beta_1 \neq 0$

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

Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

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

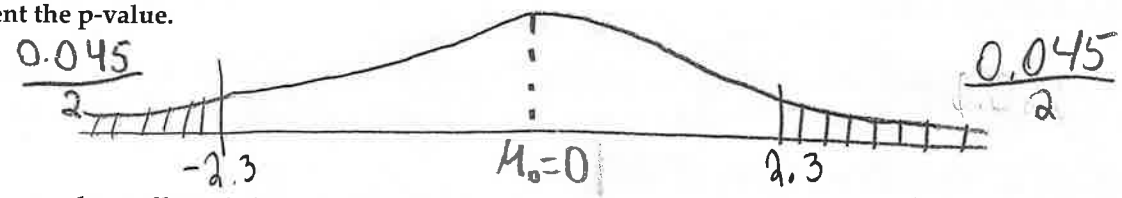
hourly_wage β_0 + β_1 × age + ε



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

wages increase by 0.85 for every year older someone is.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

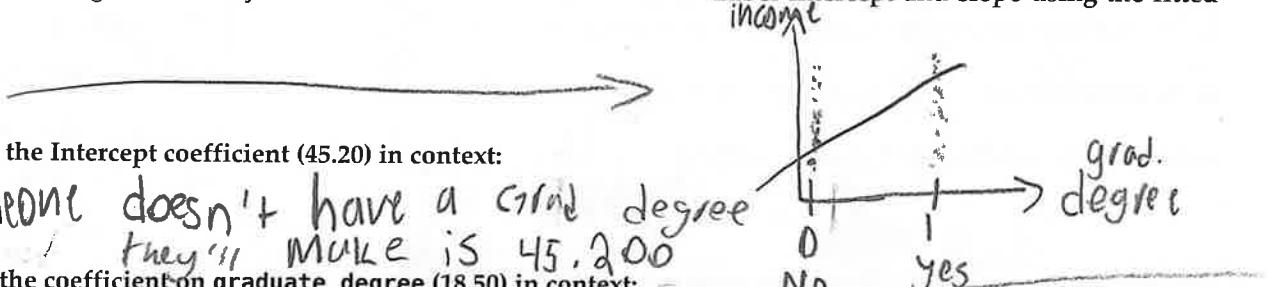


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

if someone doesn't have a grad degree they'll make is 45,200

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

There is a 18.5 difference in income if you have a grad degree/ if you do not

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Ryan Olijal Student ID: 4785321

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + remote (1) × β_1 + e

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? working remote doesn't have an effect on prod.

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

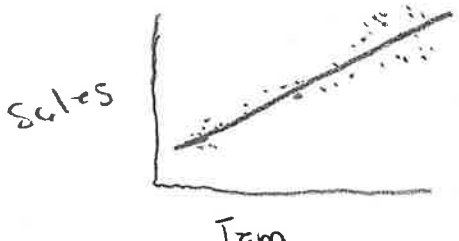
a) Write down a statistical model to test this question.

Sales = β_0 + Temp × β_1 + e

b) What part of your statistical model would indicate that temperature affects sales?

The slope of (β_1)

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

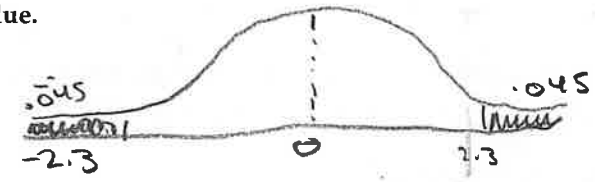
a) Write down a statistical model to test this relationship.

Wage = β_0 + Age × β_1 + e

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every year increase, the average Wage increase $.85/hr

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

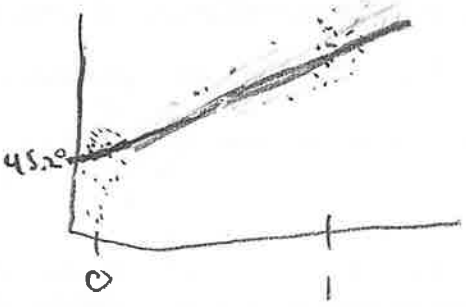


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average salary for someone with no graduate degree is 45,200

c) Interpret the coefficient on graduate_degree (18.50) in context:

If you have a graduate degree, on average you will earn $18,500 more/year

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Logan Barger Student ID: 472-6891

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity Score = β_0 + β_1 × in-office + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$ (in office)

c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78$ (out of office)

d) What is the default null hypothesis for β_1? $H_0: \beta_0 = \beta_1$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

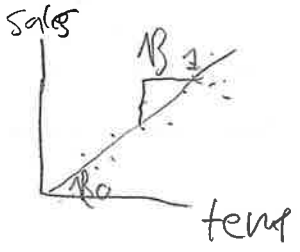
a) Write down a statistical model to test this question.

Ice Cream Sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_0

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

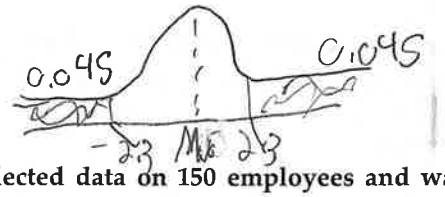
a) Write down a statistical model to test this relationship.

hourly_wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every year age adder hourly-wage increases by 0.85.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

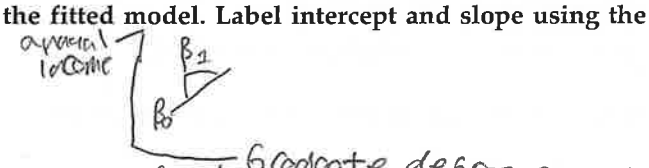


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The average starting salary is $45.2k for those without graduate degrees.

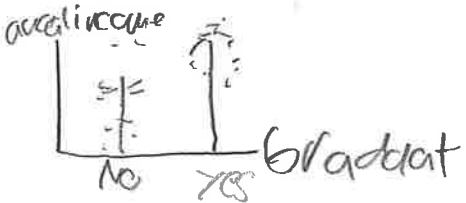
c) Interpret the coefficient on graduate_degree (18.50) in context:

Those with graduate degrees earn 18.5k more on average each year than those without.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☑ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Ella Shroff Student ID: 4751899

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote + e

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

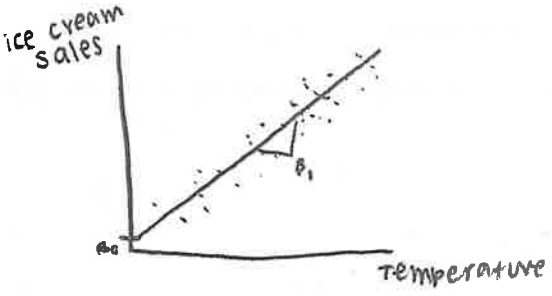
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temperature + e

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts `hourly_wages` using a sample of n=250 workers.

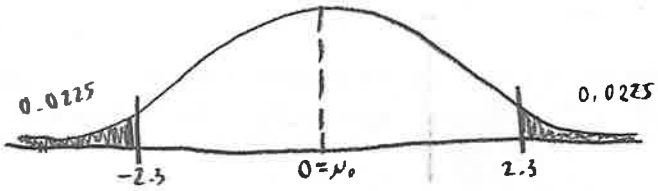
a) Write down a statistical model to test this relationship.

wages = β_0 + β_1 × age + e

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Wages increase by 0.85 for every additional year older someone is.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

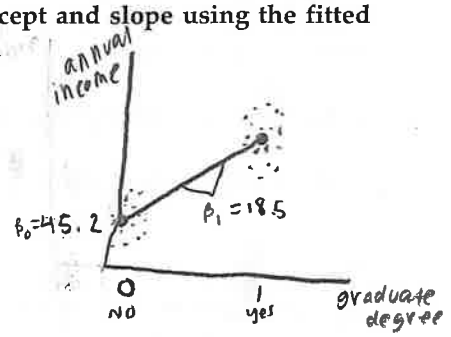


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual income for workers with no graduate degree is 45.2.

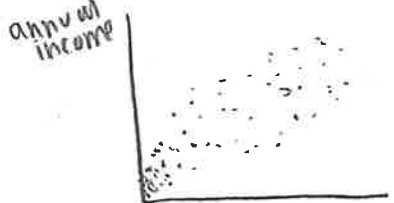
c) Interpret the coefficient on `graduate_degree` (18.50) in context:

Annual income increases by 18.5 for every additional degree they have.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Myriam Rondiga Student ID: 45455515

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

1 Remote = 82
0 in office = 78

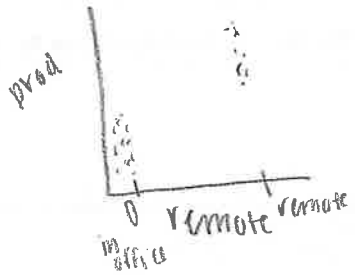
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

$\underset{\text{prod}}{y} = \beta_0 + \beta_1 \times \text{remote} + \varepsilon$

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 5

d) What is the default null hypothesis for β_1? 0 — no difference.



Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

(temperature = x, ice cream sales = y)

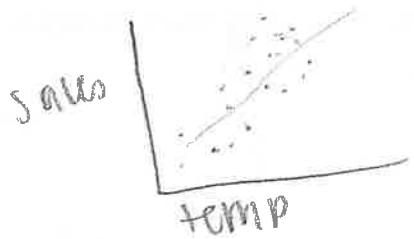
a) Write down a statistical model to test this question.

$\underset{y}{\text{sales}} = \beta_0 + \beta_1 \times \text{temp} + \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

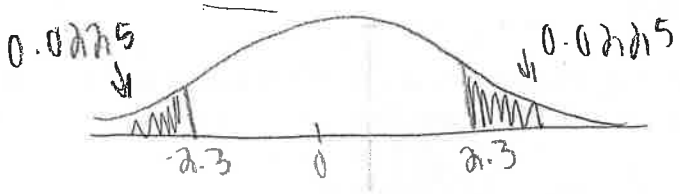
a) Write down a statistical model to test this relationship.

$\underset{y}{\text{hrlywage}} = \underline{\beta_0} + \underline{\beta_1} \times \underset{x}{\text{age}} + \underline{\varepsilon}$

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

there is a positive relationship between hourly wage and age

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

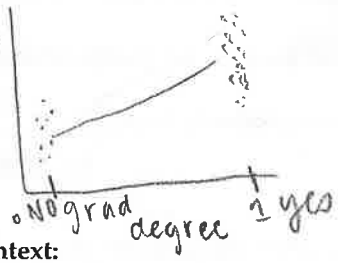


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

income for male w/ no grad degree is 45.20

c) Interpret the coefficient on graduate_degree (18.50) in context:

income increases by 18.50 if you have a college degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☒ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
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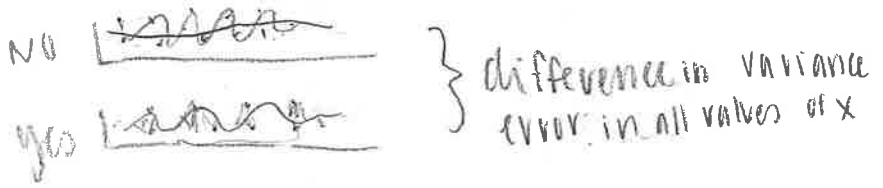
e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: giana torri Student ID: 46361747

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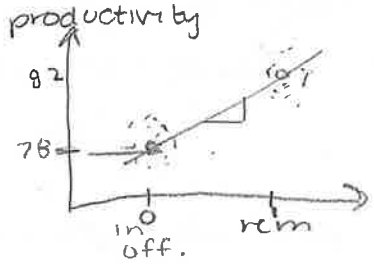
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

$\hat{y}$ = prod + β_0 × college + β_1



b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

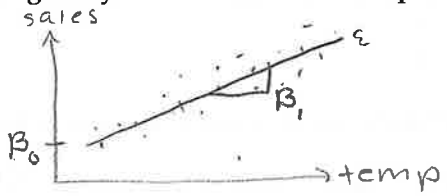
c) Based on the information given, what would β_1 equal? $\beta_1 = \frac{82-78}{(4)}$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

$\hat{y}$ = sales + β_0 × temp + β_1



b) What part of your statistical model would indicate that temperature affects sales?

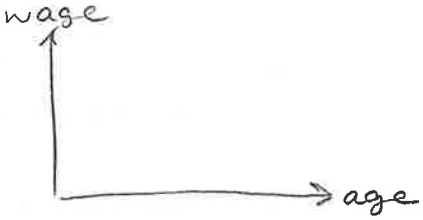
β_1

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

Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

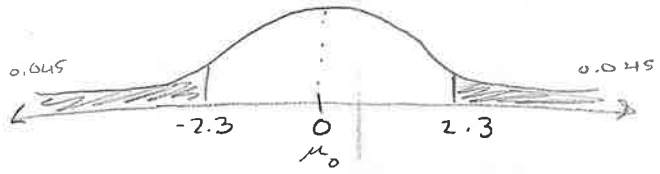
ε = wage + β_0 × age + β_1



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

wage increases 0.85 for every 1 year increase in age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

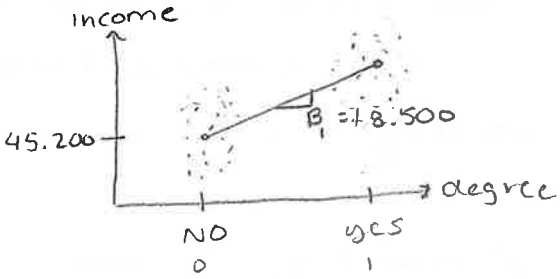


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

income for workers w/ no degree is 45.2(thousand)

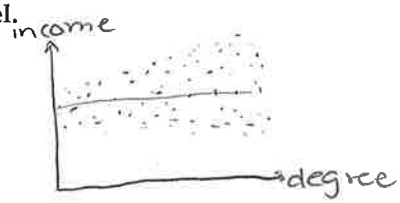
c) Interpret the coefficient on graduate_degree (18.50) in context:

wages increase by 18.50 w/ an increase from no to yes.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- Only 0.1% of the income difference between groups is due to random chance
- There's a 99.9% probability that the true coefficient is at least 18.5
- The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Connor Richards Student ID: 45790886

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

$\underset{0}{\text{office}} = \beta_0 + \beta_1 \times \underset{1}{\text{remote}} + \varepsilon$

in off. $= 78$
remote $= 82$
$n = 80$

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

H_0: $\beta_1 = 0$
null remote

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

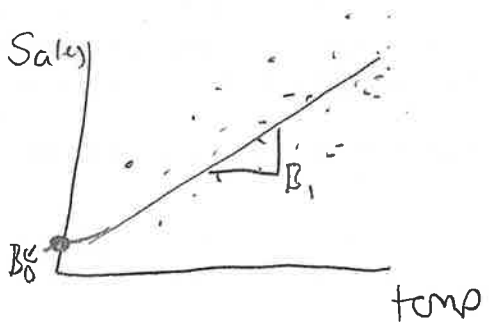
a) Write down a statistical model to test this question.

$\text{sales} = \beta_0 + \beta_1 \times (\text{temp}) + \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

A positive β_1 indicates that

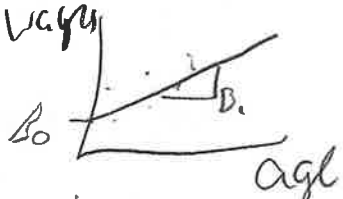
c) Sketch (*to the right* ->) how you would visualize this model.



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

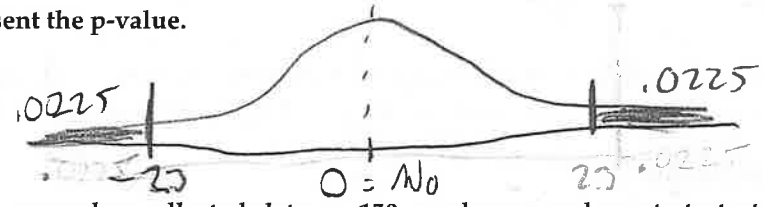
hourly_wage = β_0 + β_1 × age + ε



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every unit increase in age, we expect 0.35 increase in hourly_wage

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

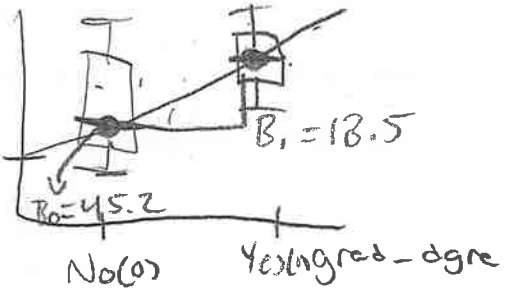


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The median of annual income with NO degree is 45.20

c) Interpret the coefficient on graduate_degree (18.50) in context:

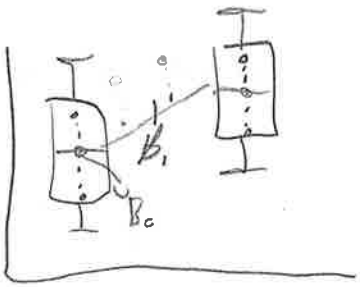
With a degree, the income is expected to increase by 18.50 on

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

There is an equal error variance across all values of X.



Name: Ryan Berry Student ID: 4757443

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

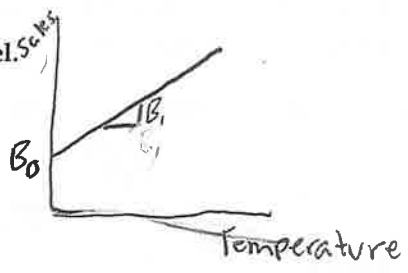
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

If β_1 does not equal 0

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

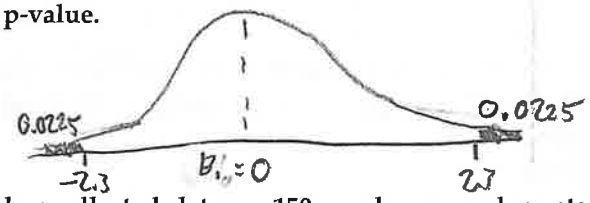
a) Write down a statistical model to test this relationship.

hourly_wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every year of a persons age, their hourly wage is expected to increase by $0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

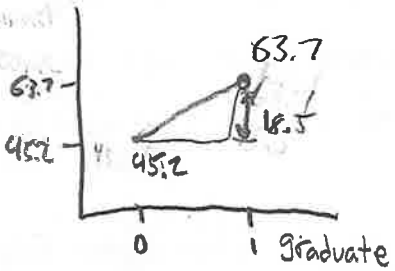


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

The expected annual income for a person without a graduate degree is $45,200

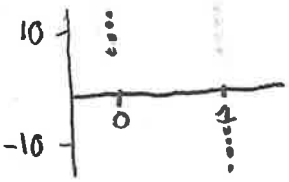
c) Interpret the coefficient on graduate_degree (18.50) in context:

If a person has a graduate degree, their expected annual income increases by $18,500

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Chase Arthur Student ID: 4628108

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

$PS = \beta_0 + \beta_1 \times \text{in-office} + \epsilon$ ← epsilon PS = productivity score

b) Based on the information given, what would β_0 equal? $\beta_0 = 80$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $\beta_1 \neq \beta_0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

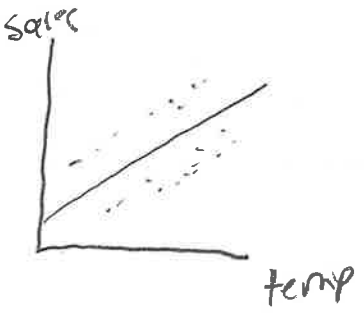
a) Write down a statistical model to test this question.

$sales = \beta_0 + \beta_1 \times temp + \epsilon$

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

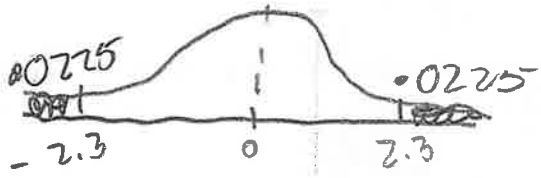
a) Write down a statistical model to test this relationship.

$\hat{Y}_{\text{hourly\_wages}} = \beta_0 + \beta_1 \times \text{age} + \varepsilon$

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Each additional year of age hourly_wages increase by 0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



.045 ÷ 2

$\sqrt{.045}$ / 2

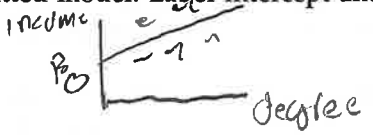
.0225 + .0225 = .045

Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

annual income of employees with no degree

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

income increases by 18.50 if you have a degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☒ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Ragan Liepsch Student ID: 4614370

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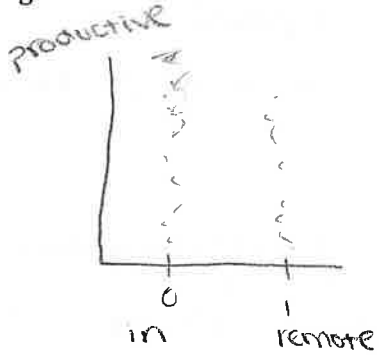
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity score = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = 78$

d) What is the default null hypothesis for β_1? 0



Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

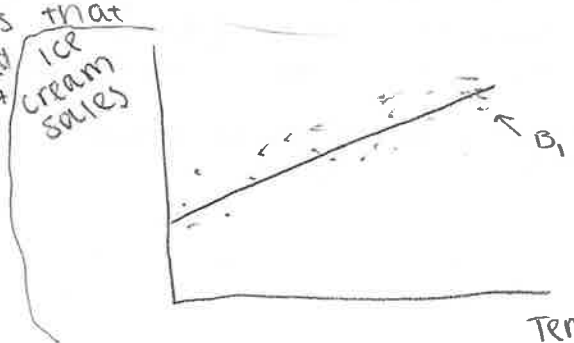
a) Write down a statistical model to test this question.

ice cream sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 because that is the slope of the line which says that points in ice cream and temp are relatively or not

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

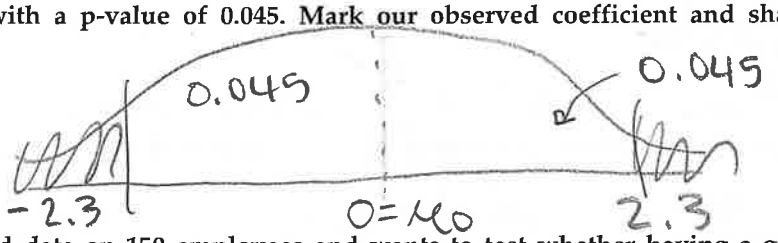
a) Write down a statistical model to test this relationship.

hrly wage = B_0 + B_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

A B_1 of 0.85 means that hourly wage increases by 0.85 for every additional year someone is older (age).

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

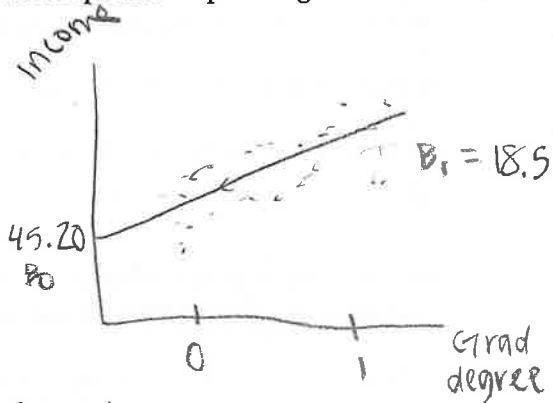


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual income for employees with no graduate degree is 45.20.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

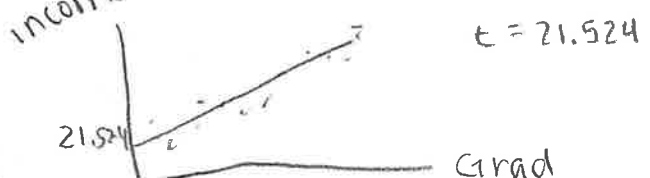
Annual income increases by 18.50 for every additional graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model. equal error variance across all values of X

All the points have equal error variance across all values of X



Name: Charlie Voss Student ID: 4716256

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × workes + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

82 − 78 = 4

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 4

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

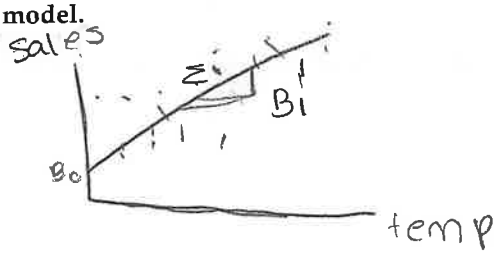
a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

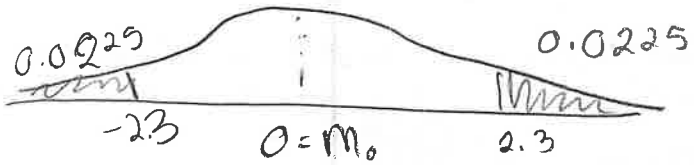
a) Write down a statistical model to test this relationship.

hourly_wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional year of age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

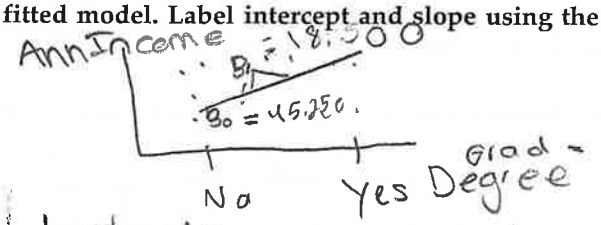


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual salary for those w/out graduate degree is 45.20 on average

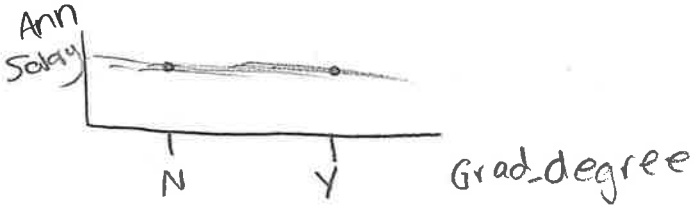
c) Interpret the coefficient on graduate_degree (18.50) in context:

Annual salary increases on average by 18.50 for on addition of a graduate degree.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Ethan Stobel Student ID: 4719489

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = B_0 + B_1 × employees + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 82$

c) Based on the information given, what would β_1 equal? $\beta_1 = 78$

d) What is the default null hypothesis for β_1? 0

$\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

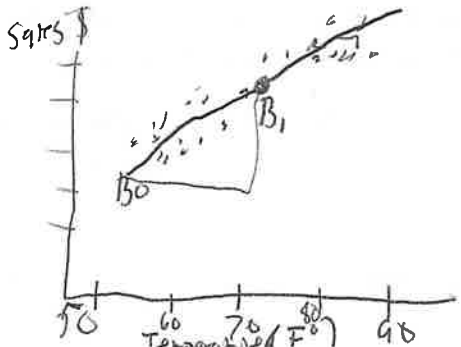
a) Write down a statistical model to test this question.

Sales = B_0 + B_1 × temp. + ε

b) What part of your statistical model would indicate that temperature affects sales?

The positive correlation and slope →

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

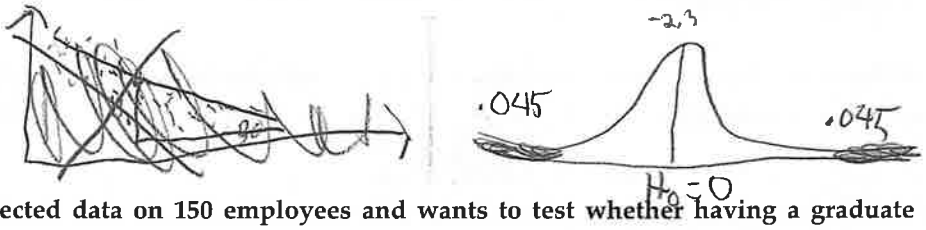
a) Write down a statistical model to test this relationship.

hourly_wages = β_0 + β_1 × worker sample + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

positive correlation with strength and confidence of 95%

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.

b) Interpret the Intercept coefficient (45.20) in context:

how much you make on average (salary)

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

How much a grad degree earns you more, (18.5 +)

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☆ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
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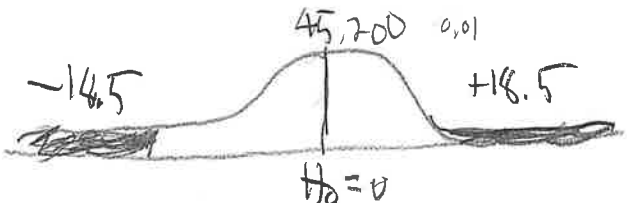
e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Jack Bochkoris Student ID: 4631980

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

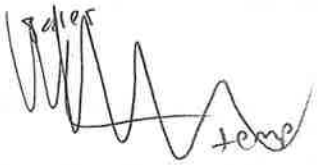
in office = β_0 + β_1 × remote + E

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).



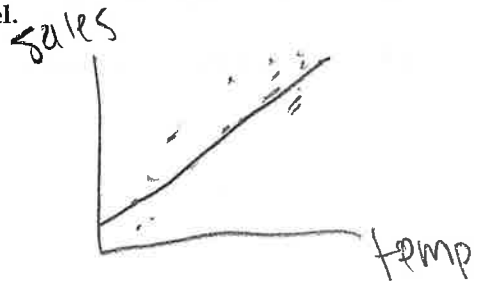
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × temp + E

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

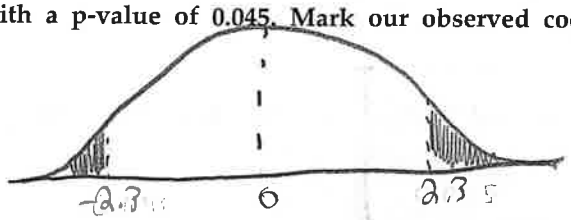
a) Write down a statistical model to test this relationship.

wages = β_0 + β_1 × age + E

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every 1 unit of age increase, hourly wage will increase by 0.85.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

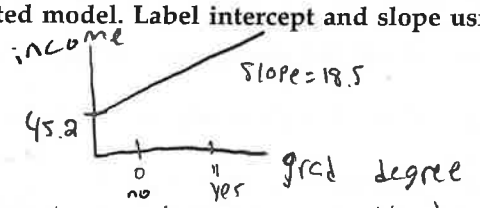


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

annual income for employees with no graduate degree would be 45,100.

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

annual income increases by 18.50 for every additional

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- [x] Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- [ ] If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- [ ] Only 0.1% of the income difference between groups is due to random chance
- [ ] There's a 99.9% probability that the true coefficient is at least 18.5
- [ ] The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Name: Tim Mooney Student ID: 4482231

ECON 0150 | MiniExam 4 | Fall 2025

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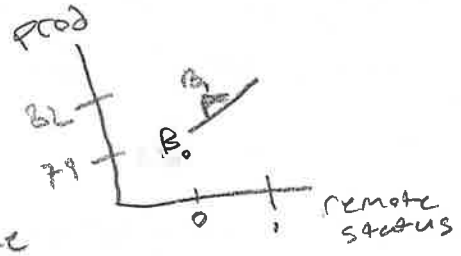
Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity = β_0 + β_1 × remote status + ε

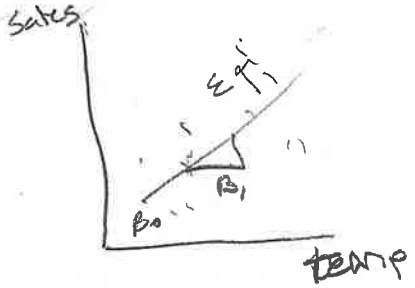


b) Based on the information given, what would β_0 equal? β_0 = 78

c) Based on the information given, what would β_1 equal? β_1 = 4

d) What is the default null hypothesis for β_1? $\beta_1 = 0$
There is no difference in productivity.

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

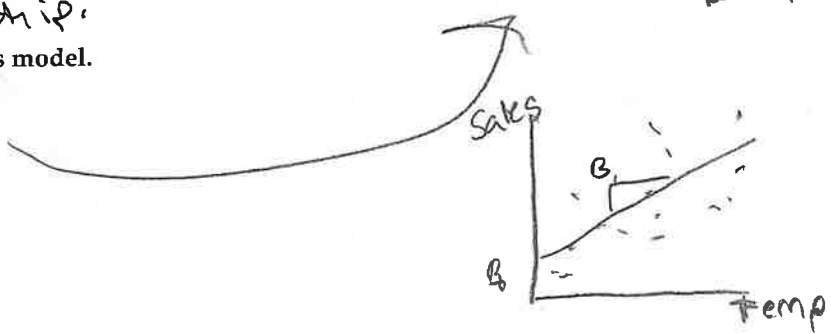


a) Write down a statistical model to test this question.

sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?
β_1 not being 0 means there is a relationship.

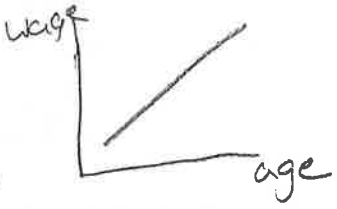
c) Sketch (*to the right* ->) how you would visualize this model.



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

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

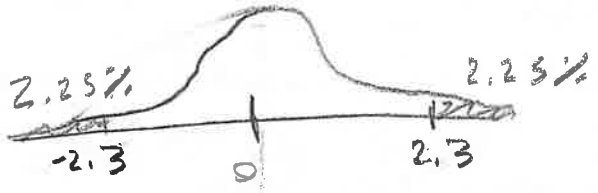
$\text{Wage} = \beta_0 + \beta_1 \times \text{Age} + \varepsilon$



b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every year older a worker is, their wage is $.85 higher.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



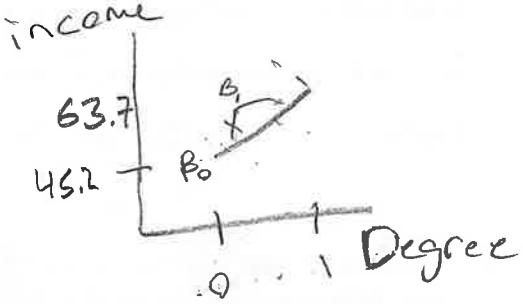
Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

45 + 18 = 63

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

People without a graduate degree make 45.2 thousand.

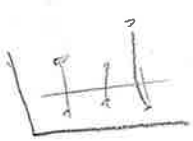
c) Interpret the coefficient on `graduate_degree` (18.50) in context:

If you have a graduate degree you make about 18.5 thousand more than someone without one.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



I forgot what this means

Yeah

Name: Christian Ketels Student ID: 4704976

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outcome: prod scores

Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

prod. scores = β_0 (In office) + β_1 × Remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 82$

d) What is the default null hypothesis for β_1? $\beta_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

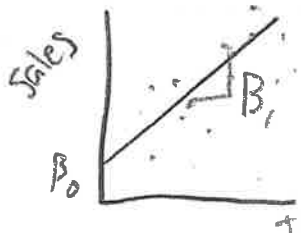
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × Temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

$\beta_1 \neq 0$

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



Q3. You want to examine whether `age` predicts `hourly_wages` using a sample of n=250 workers.

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

hourly Wages $= \beta_0 + \beta_1 \times age + \varepsilon$

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every 1 unit increase of age, hourly wages increase by $0.85

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

.045 / 2

.0225 .0225 / 450

225 / 2 / 650

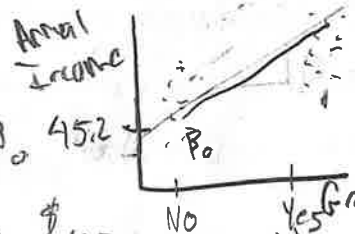
Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

.00450 β_0 .0225 β_1

Note: `graduate_degree` is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

If our null is true, and grad degree & annual income have no relationship, we would see $45.2 (thousand) annual income

c) Interpret the coefficient on `graduate_degree` (18.50) in context:

For an increase in degree status (Y or N), we will see increase in annual income by 18.5 (thousand dollars)

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

T N ☒ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large

X ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero

— ☒ Only 0.1% of the income difference between groups is due to random chance

— ☐ There's a 99.9% probability that the true coefficient is at least 18.5

+ ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Eq. variance

Name: Will Brubaker Student ID: 4547937

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a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = β_1 + β_0 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 82

d) What is the default null hypothesis for β_1? _____

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

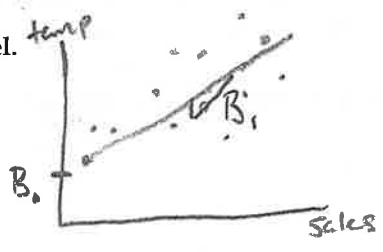
a) Write down a statistical model to test this question.

Sales = β_1 + β_0 × Temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 would indicate if sales increase or decrease due to temperature

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

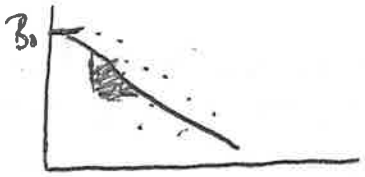
a) Write down a statistical model to test this relationship.

H Wage = B_1 + B_0 × Age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

This indicates that there is a relationship between age and hourly wages.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

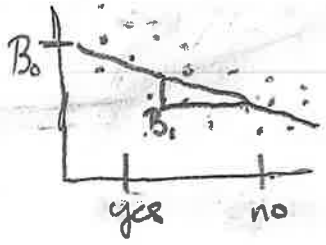


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Incomes for people with college degrees peak.

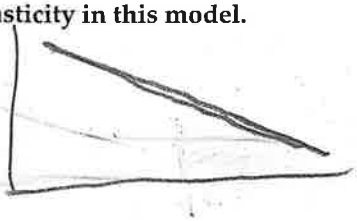
c) Interpret the coefficient on graduate_degree (18.50) in context:

Where incomes of most college degree holders.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☑ There's a 99.9% probability that the true coefficient is at least 18.5
- ☑ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Amer Barawan Student ID: 4640677

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

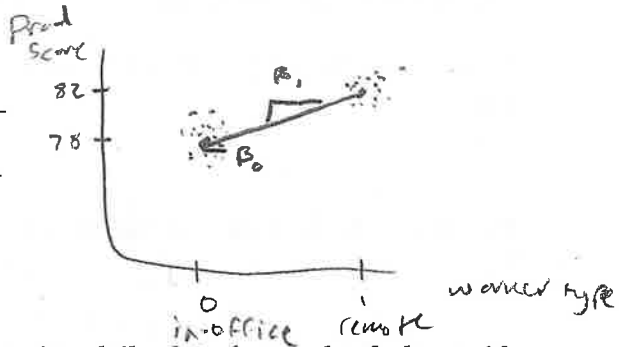
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity score $= \beta_0 + \beta_1 \times \text{worker} + \varepsilon$

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? $H_0: \beta_1 = 0$



Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

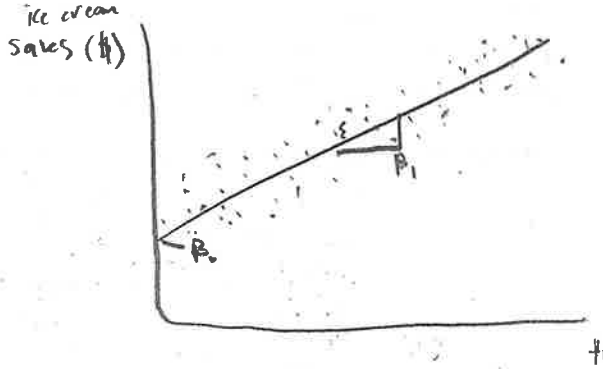
a) Write down a statistical model to test this question.

ice cream sales $= \beta_0 + \beta_1 \times \text{temperature} + \varepsilon$

b) What part of your statistical model would indicate that temperature affects sales?

β_1

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

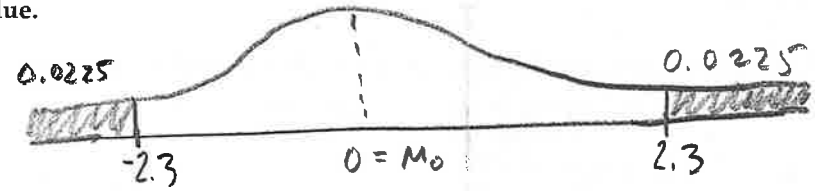
hourly wage = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional year of age.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

0.0225

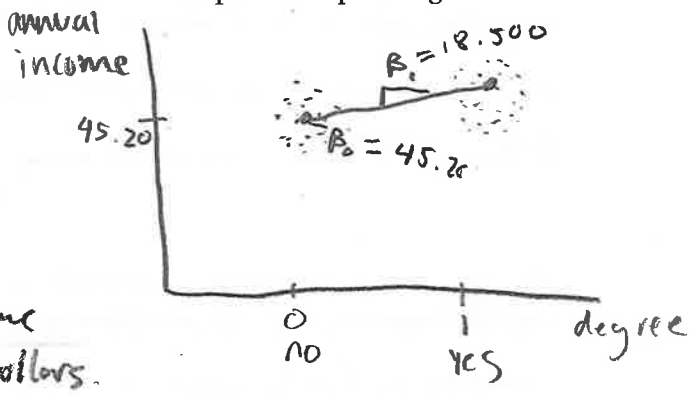


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

		coef	std err	t	P>|t|	[0.025	0.975]
Intercept	β_0	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	β_1	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Not having a degree gives an average annual income of 45.20 thousand dollars.

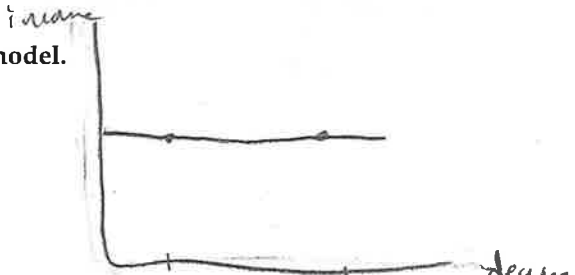
c) Interpret the coefficient on graduate_degree (18.50) in context:

Having a degree increases annual income by an average of 18.500 thousand dollars.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

☑ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
☐ Only 0.1% of the income difference between groups is due to random chance
☐ There's a 99.9% probability that the true coefficient is at least 18.5
☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Henry Cooper Student ID: 4730704

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity score = β_0 + β_1 × remote + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

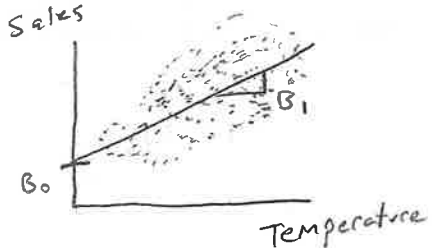
a) Write down a statistical model to test this question.

Sales = β_0 + β_1 × temperature + ε

b) What part of your statistical model would indicate that temperature affects sales?

If $\beta_1 \neq 0$, we can say there is a relationship

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

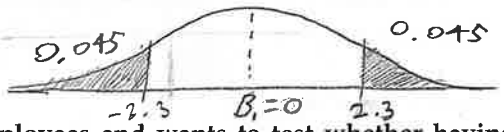
a) Write down a statistical model to test this relationship.

hourly wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

This would mean that for every one unit increase in age, hourly wage increases by 0.85.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

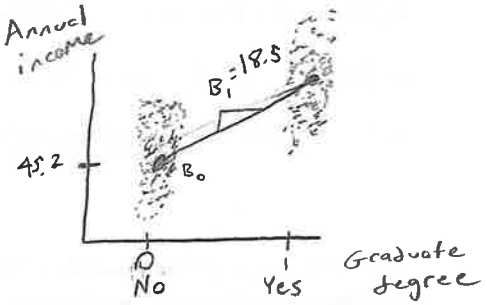


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Average annual income for those with no graduate degree

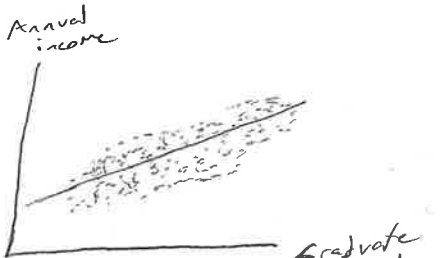
c) Interpret the coefficient on graduate_degree (18.50) in context:

We see a slope of 18.5, meaning that the difference in annual income from no graduate degree to yes is about 18.5.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- □ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- → ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- □ Only 0.1% of the income difference between groups is due to random chance
- □ There's a 99.9% probability that the true coefficient is at least 18.5
- □ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Hamsa Bandi Student ID: 4727075

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

Remote: 1 0: in office $B_0 = 78$

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity = B_0 + B_1 × Location + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 78

c) Based on the information given, what would β_1 equal? $\beta_1 =$ 4 → 82 − 78

d) What is the default null hypothesis for β_1? $H_0: B_1 = 0$

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

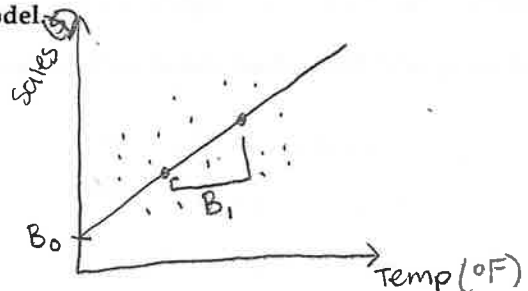
a) Write down a statistical model to test this question.

Sales($) = B_0 + B_1 × Temp (°F) + ε

b) What part of your statistical model would indicate that temperature affects sales?

The P-value of B_1 (the coefficient) being a small value would indicate that temperature affect sales.

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

hourly_wages = B_0 + B_1 × Age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

The B_1 shows that hourly wages increase by 0.85 for every additional year older someone is.

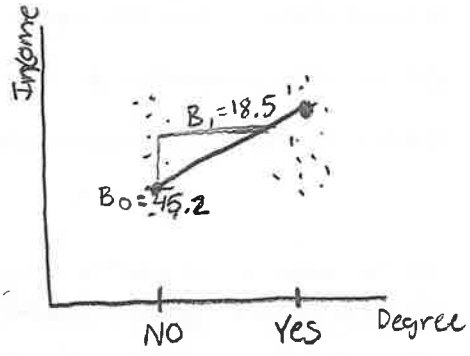
Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

B_0 = 45.20 represents the average income in thousands for someone without a graduate degree

c) Interpret the coefficient on graduate_degree (18.50) in context:

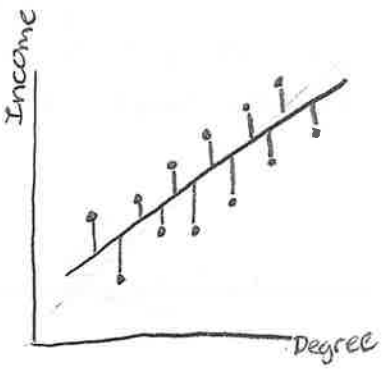
B_1 = 18.50 represents that wages increase by 18.50 in thousands if someone did get a graduate degree compared to not having one.

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☑ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.

Heteroscedastic because residuals are constant across levels of predictors →



Name: Maya Evans Student ID: 47743118

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity score = B_0 + B_1 × in v. out office + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

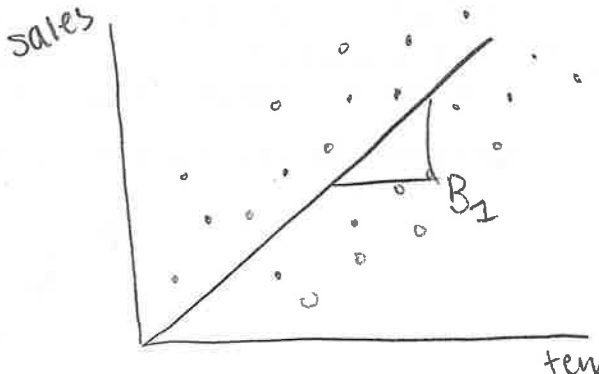
a) Write down a statistical model to test this question.

Ice Cream Sales = B_0 + B_1 × temp in °F + ε

b) What part of your statistical model would indicate that temperature affects sales?

B_1 is pos/neg, not 0

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

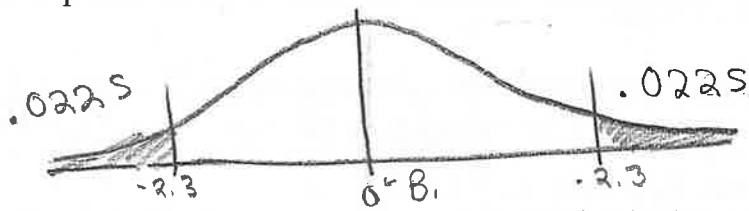
hourly wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by .85 for every additional year of age

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

.045/2 = 22.5

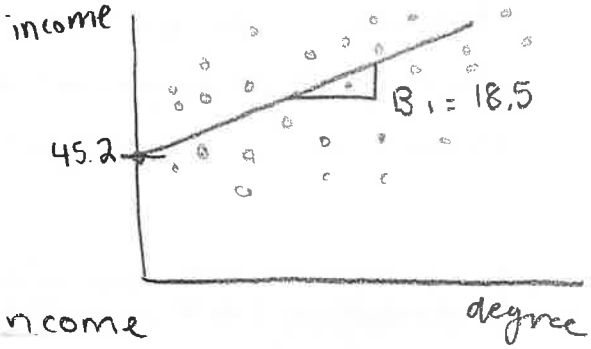


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Income for workers with no degree is 45.2

c) Interpret the coefficient on graduate_degree (18.50) in context:

For every graduate degree earned, income increases by 18.5

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- □ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- □ Only 0.1% of the income difference between groups is due to random chance
- □ There's a 99.9% probability that the true coefficient is at least 18.5
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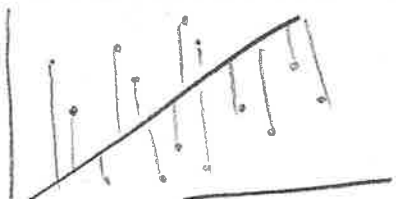
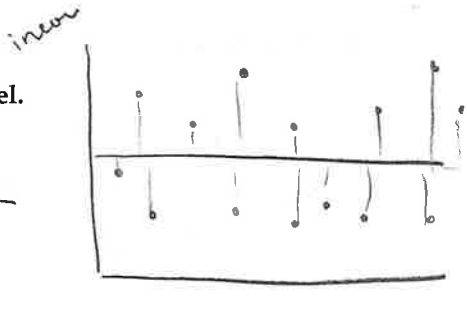
e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



OR



Name: Alex Sarris Student ID: 4621267

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a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity Score = β_0 + β_1 × workers + ε

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

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

Sales = β_0 + β_1 × temp + ε

b) What part of your statistical model would indicate that temperature affects sales?

β_1 demonstrates that a relationship between the two variables exists when $\beta_1 \neq 0$.

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

Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

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

wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

Hourly wages increase by 0.85 for every additional year of experience.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

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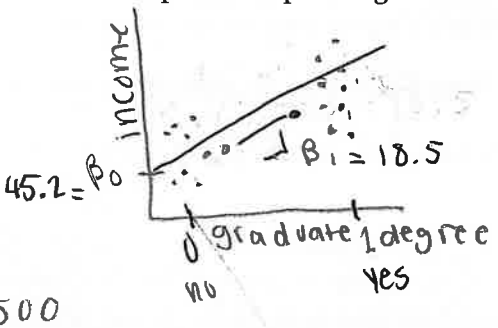
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

Annual Income for those without a graduate degree is $45,200 on average

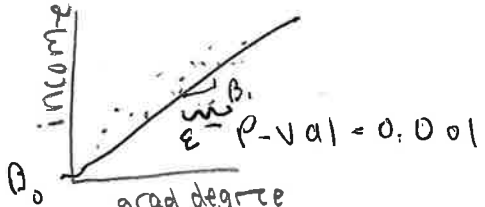
c) Interpret the coefficient on graduate_degree (18.50) in context:

Annual income increases by $18,500 on average when you have a graduate degree

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☑ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Allyson Yedrdjj Student ID: 4751143

ECON 0150 | MiniExam 4 | Fall 2025

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Academic Conduct Code

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AN I will complete this MiniExam solely using my own work.
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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

productivity score = B_0 + B_1 × office type + ε

b) Based on the information given, what would β_0 equal? $\beta_0 =$ 82 (remote workers)

c) Based on the information given, what would β_1 equal? $\beta_1 = 82 - 78 = 4$ (slope)

d) What is the default null hypothesis for β_1? 0 or no difference

Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

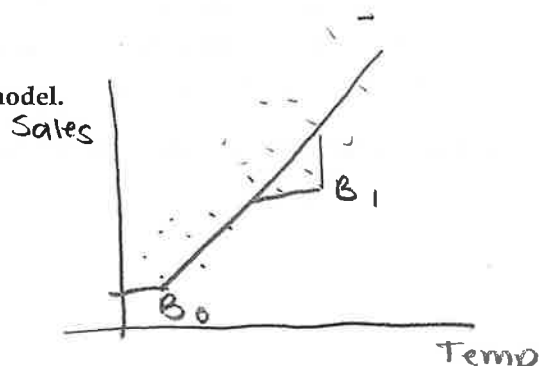
a) Write down a statistical model to test this question.

Sales = B_0 + B_1 × temp. + ε

b) What part of your statistical model would indicate that temperature affects sales?

If B_1 is not equal to zero

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

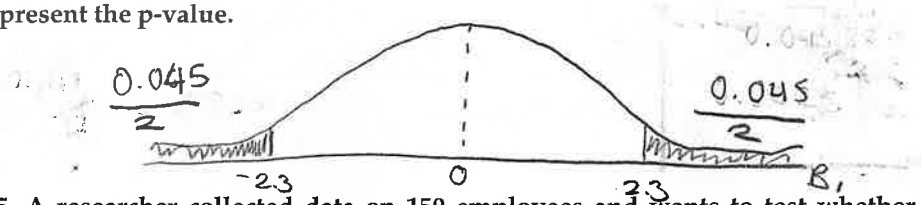
a) Write down a statistical model to test this relationship.

wages = β_0 + β_1 × age + ε

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

0.85 gets added to your hourly wage each year you age up.

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.

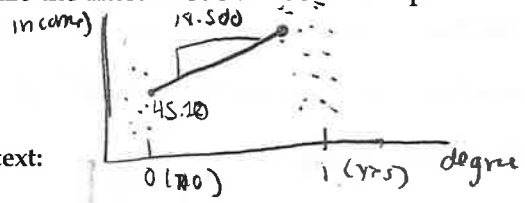


Q5. A researcher collected data on 150 employees and wants to test whether having a graduate degree affects annual income. The regression output shows:

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	45.200	2.100	21.524	0.000	41.044	49.356
graduate_degree	18.500	5.250	3.524	0.001	8.129	28.871

Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

annual income for those without grad degree is 45.200

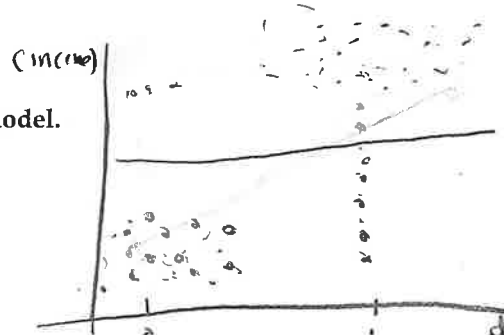
c) Interpret the coefficient on graduate_degree (18.50) in context:

having a grad degree increases your annual income by 18.500

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ● If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☐ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
- ☐ The coefficient of 18.5 has a 0.1% margin of error

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Name: Jared Shanken Student ID: 4723953

ECON 0150 | MiniExam 4 | Fall 2025

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Q1. A study uses data from 80 employees to examine whether remote workers have different productivity scores than in-office workers. Remote workers have an average productivity score of 82 and in-office workers have an average score of 78.

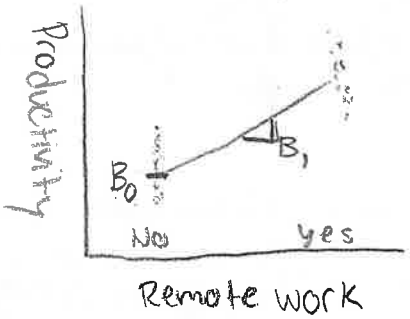
a) If we code `remote` as 1 for remote workers and 0 for in-office workers, write the regression model:

Productivity$_i$ = β_0 + β_1 × Work location + ε_i

b) Based on the information given, what would β_0 equal? $\beta_0 = 78$

c) Based on the information given, what would β_1 equal? $\beta_1 = 4$

d) What is the default null hypothesis for β_1? 0



Q2. You want to test whether temperature predicts ice cream sales using daily data from a local shop with variables `temperature` (in °F) and `sales` (in dollars).

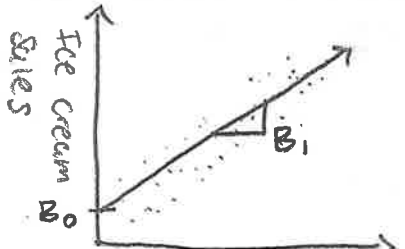
a) Write down a statistical model to test this question.

Ice cream Sales$_i$ = β_0 + β_1 × Temp. + ε_i

b) What part of your statistical model would indicate that temperature affects sales?

If β_1 is positive or Negative

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



Q3. You want to examine whether age predicts hourly_wages using a sample of n=250 workers.

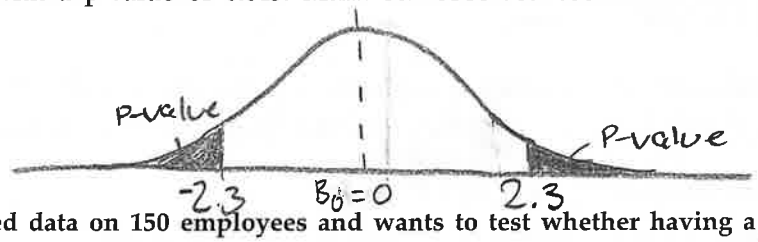
a) Write down a statistical model to test this relationship.

Hourly wages = B_0 + B_1 × age + ε_i

b) If your regression yields $\beta_1 = 0.85$, interpret this coefficient in context:

For every year older a person is, they get paid 85¢ more

Q4. Draw the sampling distribution under the null hypothesis (H_0: $\beta_1 = 0$) for a slope coefficient that has an observed value of -2.3 with a p-value of 0.045. Mark our observed coefficient and shade the region(s) that represent the p-value.



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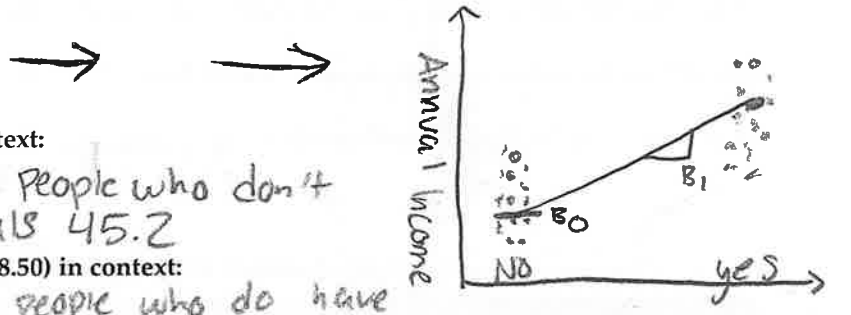
Note: graduate_degree is coded as 1 = Yes, 0 = No; income is in thousands of dollars.

a) Sketch (*to the right* ->) how you would visualize the fitted model. Label intercept and slope using the fitted values.



b) Interpret the Intercept coefficient (45.20) in context:

the average annual income for people who don't have a graduate degree equals 45.2

c) Interpret the coefficient on graduate_degree (18.50) in context:

The average annual income for people who do have a graduate degree is 18.5 more than people who don't (63.7 total)

d) What does the p-value of 0.001 for the graduate_degree coefficient mean? *(select one)*

0.1%

- ☐ Out of 1000 samples where graduate degrees truly matter, only 1 would show a coefficient this large
- ☐ If graduate degrees are unrelated to income, 0.1% of samples would have a coefficient this far from zero
- ☒ Only 0.1% of the income difference between groups is due to random chance
- ☐ There's a 99.9% probability that the true coefficient is at least 18.5
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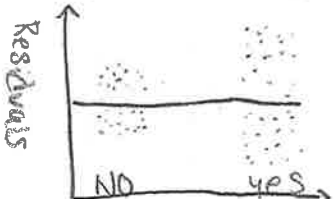
I can say this, Bonus Point?

e) Sketch (*to the right* ->) a residual plot showing heteroskedasticity in this model.



Less error for people who don't have a graduate degree than people who do