Problem 1

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

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

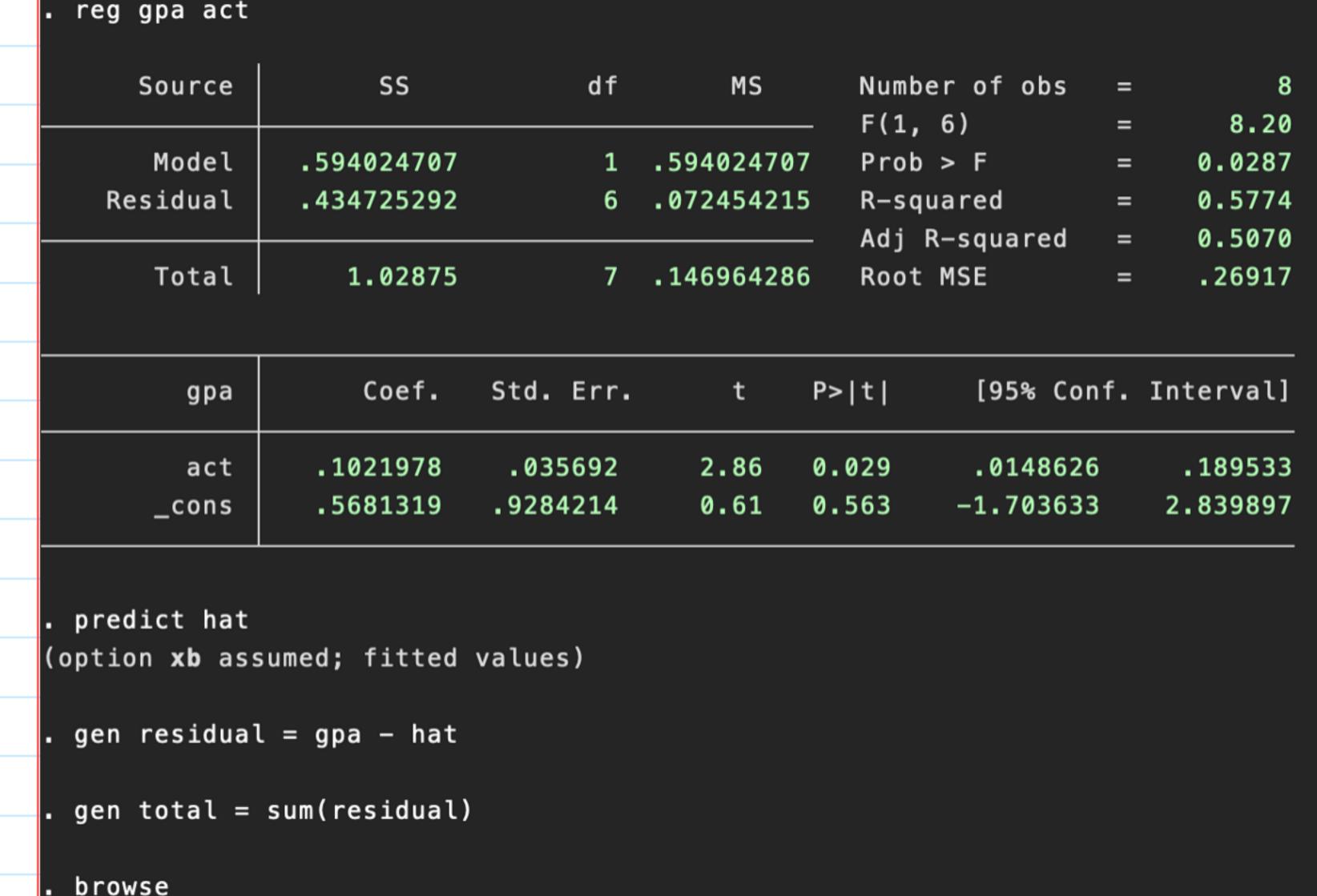
(i) Estimate the relationship between GPA and ACT using OLS; that is, obtain the intercept and slope estimates in the equation $GPA = \beta_0 + \beta_1 ACT$. Comment on the direction of the relationship. Does the intercept have a useful interpretation here? Explain. How much higher is the GPA predicted to be if the ACT score is increased by five points? If we Plus Ento Starta, we get Bo=.568 B=.102

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The intercept is not Particularly helpful but does sudicate that a zero Act is a .1 GPA
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Compute the fitted values and residuals for each observation and verify the residuals (ii) sum to zero.

102(5)= 51 GPA ENCNEASE

total = 2.38 x 10-7 reg gpa act Which Es Wase



Y= .568+.107(70)=2.608 How much of the variation in GPA for these eight students is explained by ACT?

What is the predicted value of GPA when ACT = 20?

Interpret the slope and intercept in this equation.

dollars) using the function cons = -124.84 + 0.853 inc using information from 100 families. The r-square is 0.692.

(i)

(i)

worth 9.4 dollars.

(i)

(ii)

(iii)

summ salary ceoten

tenure as a CEO?

Variable

by .312. This is the slope.

Problem 2

(iii)

The slope means that as the income increases by 1, the consumption increases by .853. The slope means that if the income is zero, the consumption is -124.84 What is the predicted consumption when the family income is \$30,000.

A student estimates the relation between annual income and consumption (both measured in

Cons = -124.84 + .853(30000)= -124.84 + 25590Cons = 25465.16

garbage incinerator (dist) log(price) = 9.4 + 0.312 log(dist)

The following equation relates housing price (price) to the distance from a recently built

n = 135 $R^2 = 0.162$

What is the coefficient of determination? Interpret? (ii) The R^2 is .162 which is the average error in the data. 16.2% of the variation in price is explained by the variation in distance.

Interpret the slope and intercept in this equation.

Problem 4

Find the average salary and the average tenure in the sample.

The data set in CEOSAL2 contains information on chief executive officers for U.S. corporations. The variable salary is annual compensation, in thousands of dollars, and ceoten is prior number of years as company CEO.

Mean

How many CEOs are in their first year as CEO (i.e. ceoten = 0)? What is the longest

Std. Dev.

Min

100

Max

5299

0.0132

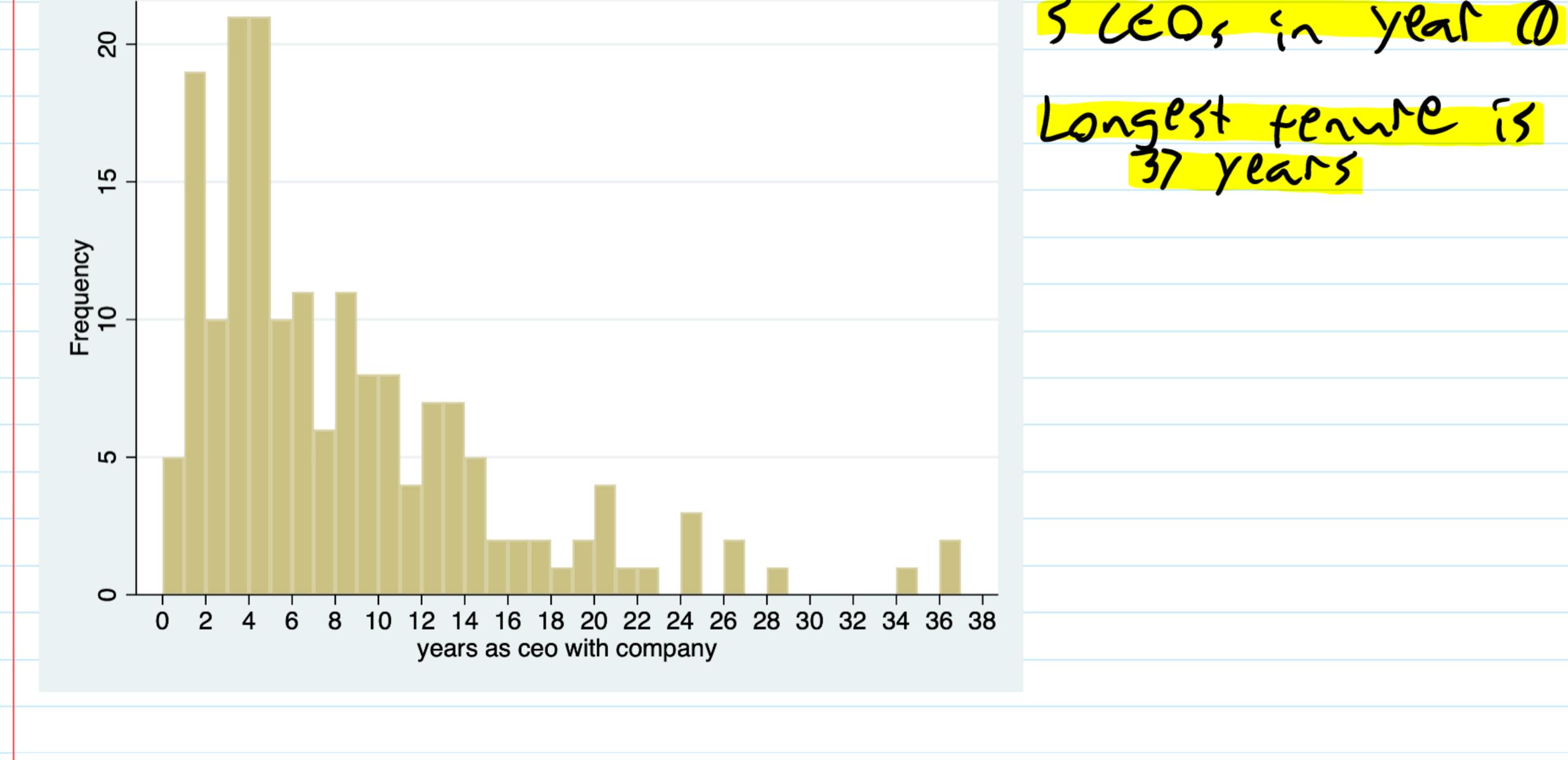
0.0075

.0222846

6.639686

865.8644 salary 587.5893 7.954802 7.150826 ceoten

0bs



Estimate the simple regression model $log(salary) = \beta_0 + \beta_1 ceoten + \varepsilon$

.364544606

1.53

95.68

Interpret the results of the regression model (coefficients and R²)

Source SS MS Number of obs df 177 F(1, 175) 2.33 Model .850907024 .850907024 Prob > F0.1284 Residual

175

.0063645

.0679911

As the ceoten increases by 1, their log(salary) increases by .0097.

Total 64.6462131 176 logSal Std. Err. Coef.

63.795306

gen logSal = log(salary)

reg logSal ceoten

ceoten

_cons

(iv)

.60378 .367308029 Root MSE P>|t| [95% Conf. Interval]

-.0028374

6.37131

0.128

0.000

R-squared

Adj R-squared

109(Salary) = 6.505 + .0097(ceofer)

.0097236

6.505498

When the ceoten is zero, their log(salary) is 6.505.

The R² is .0132 which means that 1.32% of the variation in log(salary) is explained by the variation in ceoten.

What is the predicted percentage increase in salary given one more year as a CEO? (v) The predicted % increase in salary with one more year as CEO is B_1 which is .0097. This is .97% of their current salary is the amount of the increase.