

HW 5

1. For 9 students in a speech class let x be their verbal ability on test score and y their score on their final project. The data are

$x \leftarrow c(20, 26, 33, 40, 42, 50, 54, 58, 75)$

$y \leftarrow c(52, 72, 56, 65, 76, 89, 72, 92, 98)$

- i) Find the least squares line for predicting y from x .
- ii) Let ρ be the correlation coefficient for x and y . What is the p -value for testing $H : \rho = 0$ against $K : \rho > 0$.
- iii) Find a 95% CI for β_1 .
- iv) Find a 95% CI for the mean value for the score on the final project of a student with $x = 62$.
- v) Plot the data along with the regression line.

2. For 7 horses let x be their gestation period in days and y be their life span in years.

$x \leftarrow c(414, 280, 297, 313, 362, 399, 270)$

$y \leftarrow c(24, 25.5, 20, 21.5, 22, 23.5, 21)$

- i) Find the least squares line for predicting y from x .
- ii) What is the p -value for testing $H : \beta_1 = 0$ against $K : \beta_1$ not equal 0
- iii) Find a 95% CI for β_1 .

3. A trucking company collected data on x , the number of 50 pound bags of salt in the shipment and the total weight of the shipment for 10 shipments. The data are below.

```
x<-c(100,205,450,150,500,200,150,150,300,400)
y<-c(5051,10248,20000,7421,24686,10206,7325,7160,14495,17003)
```

i) Find the least squares line for these data under the assumption that $\beta_0 = 0$ and with β_0 in the model. The command for the first model is

```
prob3.nointercept<-lsfit(x,y,intercept=F)
prob3.nointercpt$coefficient
```

and the second line will give you the estimate of β_1 for this model

ii) Make a plot that includes the data and both regression lines. Do you think β_0 belongs in the model? Briefly justify your answer.