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HW1: 17, 21, 22, 28, 29, 30, 33, 37

Date: 02/13/20

PROBLEM#17:A study was made on the amount of converted

sugar in a certain process at various temperatures. The

data were coded and recorded as follows:

Temperature, x Converted Sugar, y

1.0 8.1

1.1 7.8

1.2 8.5

1.3 9.8

1.4 9.5

1.5 8.9

1.6 8.6

1.7 10.2

1.8 9.3

1.9 9.2

2.0 10.5

(a) evaluate s2;

(b) construct a 95% confidence interval for β0;

(c) construct a 95% confidence interval for β1.

STARTING R SOLUTION BELOW FOR PART A:--------------------------------------

x^2 =

[1] 1.00 1.21 1.44 1.69 1.96 2.25 2.56 2.89 3.24 3.61 4.00

xy =

[1] 8.10 8.58 10.20 12.74 13.30 13.35 13.76 17.34 16.74 17.48 21.00

y^2 =

[1] 65.61 60.84 72.25 96.04 90.25 79.21 73.96 104.04 86.49 84.64

[11] 110.25

Sum(x) =

16.5

Sum(y) =

100.4

Sum(xy) =

152.59

Sum(y^2) =

923.58

Sum(x^2) =

25.85

b0 =

6.413636

b1 =

1.809091

Sxx =

1.1

Syy =

7.201818

Sxy =

1.99

s^2 =

[1] 0.4001919

STARTING R SOLUTION BELOW FOR PART B:--------------------------------------

[1] 4.56852

[1] 5.43148

End of Problem 17 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

PROBLEM#21: Test the hypothesis that β1 = 6 in Exercise

11.9 on page 399 against the alternative that β1 < 6.

Use a 0.025 level of significance

STARTING R SOLUTION BELOW FOR PART A:--------------------------------------

x^2 =

[1] 1600 400 625 400 900 2500 1600 400 2500 1600 625 2500

xy =

[1] 15400 8000 9875 7300 14250 22000 19600 8400 28000 21000 12000 25500

y^2 =

[1] 148225 160000 156025 133225 225625 193600 240100 176400 313600 275625

[11] 230400 260100

Sum(x) =

410

Sum(y) =

5445

Sum(xy) =

191325

Sum(y^2) =

2512925

Sum(x^2) =

15650

b0 =

343.7056

b1 =

3.220812

Sxx =

1641.667

Syy =

42256.25

Sxy =

5287.5

s^2 =

[1] 2522.621

End of Problem 21 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

PROBLEM#22: Using the value of s2 found in Exercise

11.16(a), construct a 95% confidence interval for μY |85

in Exercise 11.2 on page 398.

STARTING R SOLUTION BELOW FOR PART A:--------------------------------------

x^2 =

[1] 5929 2500 5041 5184 6561 8836 9216 9801 4489

xy =

[1] 6314 3300 5538 2448 3807 7990 9504 9801 4556

y^2 =

[1] 6724 4356 6084 1156 2209 7225 9801 9801 4624

Sum(x) =

707

Sum(y) =

658

Sum(xy) =

53258

Sum(y^2) =

51980

Sum(x^2) =

57557

b0 =

12.06232

b1 =

0.7771416

Sxx =

2018.222

Syy =

3872.889

Sxy =

1568.444

s^2 =

[1] 379.1408

End of Problem 22 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

PROBLEM#28: Done by hand

PROBLEM#29: Use the data set

y x

7 2

50 15

100 30

40 10

70 20

(a) Plot the data.

(b) Fit a regression line through the origin.

(c) Plot the regression line on the graph with the data.

(d) Give a general formula (in terms of the yi and the

slope b1) for the estimator of σ2.

(e) Give a formula for Var(ˆyi), i = 1, 2, . . . , n, for this

case.

(f) Plot 95% confidence limits for the mean response

on the graph around the regression line.

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A close up of a mans face

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