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## Unit 4 - Week 2

Course  
outline

How to access  
the portal

Pre-requisite  
Assignment

Week 1

Week 2

- Simple Linear Regression (Part D) (unit? unit=14&lesson=15)
- Simple Linear Regression (Part E) (unit? unit=14&lesson=16)
- Multiple Linear Regression (Part A) (unit? unit=14&lesson=17)
- WEEK 2 - FEEDBACK - Regression analysis (unit? unit=14&lesson=18)

## Assignment 2

The due date for submitting this assignment has passed. **Due on 2019-08-21, 23:59 IST.**  
As per our records you have not submitted this assignment.

1) There are very few occasions where it make sense to fit a model without an intercept  $\beta_0$  . If **1 point** we need to fit the model  $Y = \beta X + \epsilon$  to a set of data  $(X_1, Y_1), (X_2, Y_2), \dots, (X_n, Y_n)$ . What is the least square estimator of  $\beta$

$$\hat{\beta} = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sum(X_i - \bar{X})^2}$$

$$\hat{\beta} = \frac{\sum X_i(Y_i - \bar{Y})}{\sum X_i^2}$$

$$\hat{\beta} = \frac{\sum X_i Y_i}{\sum X_i^2}$$

No, the answer is incorrect.  
Score: 0

Accepted Answers:

$$\hat{\beta} = \frac{\sum X_i Y_i}{\sum X_i^2}$$

2) Consider Problem 1. The expectation of the least square estimator  $\hat{\beta}$  is **1 point**

$$\beta + \sum X_i^2$$

$$\beta$$

● Assignment 2  
Solution (unit?  
unit=14&lesson=19)

○ Quiz :  
Assignment 2  
(assessment?  
name=82)

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

VIDEO  
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$$\frac{\beta}{\sum X_i^2}$$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $\beta$

3) Consider Problem 1. The variance of the least square estimator  $\hat{\beta}$  is

1 point

$$\frac{\sigma^2}{\sum (X_i - \bar{X})^2}$$

$$\frac{\sigma^2}{(\sum X_i^2)^2}$$

$$\frac{\sigma^2}{\sum X_i^2}$$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $\frac{\sigma^2}{\sum X_i^2}$

4) Consider Problem 1. The  $SS_{Res} = \sum e_i^2$  has degree of freedom

1 point

n

n-1

n-2

n-3

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
n-1

5) Consider Problem 1. A  $100(1 - \alpha)\%$  confidence interval for  $\beta$  is

1 point

$$\hat{\beta} - t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}} \leq \beta \leq \hat{\beta} + t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}}$$

$$\hat{\beta} - t_{n-2, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}} \leq \beta \leq \hat{\beta} + t_{n-2, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}}$$

$$\hat{\beta} - t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum (X_i - \bar{X})^2}} \leq \beta \leq \hat{\beta} + t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum (X_i - \bar{X})^2}}$$

$$\hat{\beta} - t_{n-2, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum (X_i - \bar{X})^2}} \leq \beta \leq \hat{\beta} + t_{n-2, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum (X_i - \bar{X})^2}}$$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $\hat{\beta} - t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}} \leq \beta \leq \hat{\beta} + t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{MS_{Res}}{\sum X_i^2}}$

6)

1 point

The moisture of the wet mix of a product is considered to have an effect on the finished product density. The moisture of the mix was controlled and finished product densities were measured as shown below.

X (mix moisture)	Y (Density)
4.7	3
5.0	3
5.2	4
5.2	5
5.9	10
4.7	2
5.9	9
5.2	3
5.3	7
5.9	6
5.6	6
5.0	4

Consider fitting the model  $Y = \beta_0 + \beta_1 X + \epsilon$  to the data. A 95% confidence interval on the mean density when the moisture of the wet mix is 4.9, is

- (2.003, 4.337)
- (1.523, 4.889)
- (1.675, 4.672)
- (2.892, 4.779)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(2.003, 4.337)

7) Consider the data in Problem 6. A 90% confidence interval on the mean density when the moisture of the wet mix is 4.9, is **1 point**

- (2.221, 4.119)
- (1.723, 4.689)
- (1.775, 4.872)
- (2.885, 4.998)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(2.221, 4.119)

8) Consider the data in Problem 6. A 95% prediction interval on the density when the moisture of the wet mix is 4.9, is **1 point**

- (2.221, 4.119)
- (1.673, 5.689)
- (0.024, 6.316)
- (0.124, 6.997)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(0.024, 6.316)

