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## Defining the Linear Model - Quiz

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Recall our linear model:

$$Y_i = \beta_0 + \beta_1 x_i + \epsilon \text{ for } i = 1, 2, \dots, n$$

### Question 1

1/1 point (graded)

True or False:  $E[Y_i] = \beta_0 + \beta_1 X_i + E[\epsilon]$ ☒ a. True ✓☐ b. False

### Explanation

This expression is correct. However, recall that  $E[\epsilon_i] = 0$ , and so we can simplify this further to:

$$E[Y_i] = E[\beta_0 + \beta_1 X_i + \epsilon_i] = E[\beta_0] + E[\beta_1 X_i] + E[\epsilon_i] =$$

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**The Linear Model**

due Nov 28, 2016 05:00 IST



$$\beta_0 + \beta_1 X_i + 0 = \beta_0 + \beta_1 X_i$$

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You have used 1 of 1 attempt

✓ Correct (1/1 point)

**Question 2**

1/1 point (graded)

We usually find estimates for  $\beta_0$  and  $\beta_1$  by using a least squares estimator. Which of the following is the least squares estimator?

- ☐ a.  $\min_{\beta} \sum_i |Y_i - \beta_0 - \beta_1 X_i|$
- ☐ b.  $\min_{\beta} \sum_i (Y_i - \beta_0 - \beta_1 X_i)$
- ☐ c.  $\min_{\beta} \sum_i \left( \frac{X_i - \beta_0}{\beta_1 - Y_i / \beta_1} \right)^2$
- ☒ d.  $\min_{\beta} \sum_i (Y_i - \beta_0 - \beta_1 X_i)^2$  ✓

**Explanation**

**The Multivariate Linear Model**

due Nov 28, 2016 05:00 IST

**Module 9: Homework**

due Nov 21, 2016 05:00 IST



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The least squares estimator minimizes the sum of squared residuals. The residual  $(Y_i - (\beta_0 + \beta_1 X_i))$  is the difference between the true and predicted values of  $Y_i$ . The first option (a) is called the least absolute deviations estimator. The third option (c) is called the reverse least squares estimator.

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