## Linear Regression Models Quiz

1. A family would like to build a linear regression equation to predict the amount of grain harvested per acre of land on their farm. They subdivide their land into several smaller plots of land for testing and would like to select an explanatory variable they can control. Which of the following is an appropriate explanatory variable that the family could use to create a linear regression equation?

   (A) The total amount of rainfall recorded at their farm

   (B) The type of crop planted in the plot the previous year

   (C) The average daily temperature at their farm

   (D) The variety of grain planted in the plot

   (E) The amount of fertilizer applied to each plot of land

2. For a specific species of fish in a pond, a wildlife biologist wants to build a regression equation to predict the weight of a fish based on its length. The biologist collects a random sample of this species of fish and finds that the lengths vary from 0.75 to 1.35 inches. The biologist uses the data from the sample to create a single linear regression model. Would it be appropriate to use this model to predict the weight of a fish of this species that is 3 inches long?

   (A) Yes, because 3 inches falls above the maximum value of lengths in the sample.

   (B) Yes, because the regression equation is based on a random sample.

   (C) Yes, because the association between length and weight is positive.

   (D) No, because 3 inches falls above the maximum value of lengths in the sample.

   (E) No, because there may not be any 3-inch fish of this species in the pond.

3. The least-squares regression line $\hat{y} = 1.8 - 0.2x$ summarizes the relationship between velocity, in feet per second, and depth, in feet, in measurements taken for a certain river, where $x$ represents velocity and $y$ represents the depth of the river. What is the predicted value of $y$, in feet, when $x = 5$?

   (A) $-16$

   (B) $-1$

   (C) $-0.2$

   (D) $0.8$

   (E) $1.8$