

### Answer on Question #55199 – Math – Statistics and Probability

Consider the roller coasters described in exercise 30 again. The regression analysis gives the model  
 $\text{duration} = 64.232 + 0.180 \text{ drop}$

- a) Explain what the slope of the line says about how long a roller coaster ride may last and the height of the coaster
- b) A new roller coaster advertises an initial drop of 200 feet. How long would you predict the ride lasts
- c) Another coaster with 50 foot initial drop advertises a 2 minute ride. Is it longer or shorter than you would expect? By how much? What's that called?

#### Solution

a) According to the linear model, the duration of a coaster ride is expected to increase by about 0.180 seconds for each additional foot of initial drop.

b)  $\widehat{\text{duration}} = 64.232 + 0.180 (\text{drop})$

$$\widehat{\text{duration}} = 64.232 + 0.180 (200) = 100.232 \text{ s.}$$

According to the linear model, a coaster with a 200 foot initial drop is expected to last 100.232 seconds.

c)  $\widehat{\text{duration}} = 64.232 + 0.180 (50) = 73.232 \text{ s.}$

According to the linear model, a coaster with a 50 foot initial drop is expected to last 73.232 seconds. The advertised duration is longer, at 120 seconds.

The difference is 120 seconds – 73.232 seconds = 46.768 seconds. This is called a residual.