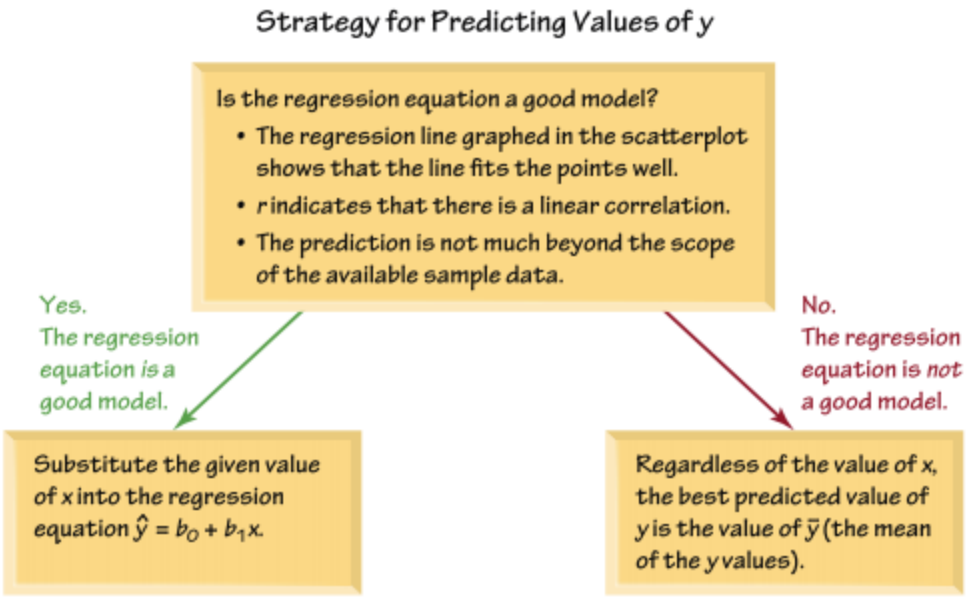


Figure 10-5 Recommended Strategy for Predicting Values of *y*

Figure 10-5 summarizes a strategy for predicting values of a variable y when given some value of x. Figure 10-5 shows that if the regression equation is a good model, then we substitute the value of x into the regression equation to find the predicted value of y. However, if the regression equation is not a good model, the best predicted value of y is simply $\bar{y}$, the mean of the y values. Remember, this strategy applies to *linear* patterns of points in a scatterplot. If the scatterplot shows a pattern that is not a straight-line pattern, other methods apply, as described in Section 10-6.

Example 4 Predicting Height

Use the given data to predict the height of someone with a shoe print length of 29 cm.

a. Use the 5 pairs of shoe print lengths and heights from Table 10-1 to predict the height of a person with a shoe print length of 29 cm.

b. Use the 40 pairs of shoe print lengths and heights from Data Set 2 in Appendix B and predict the height of a person with a shoe print length of 29 cm.

Solution

Shown below are key points in the solutions for parts (a) and (b). Note that in part (a), the paired data *do not* result in a good regression model, so the predicted height is $\bar{y}$, the mean of the five heights. However, part (b) shows that the shoe print and height data *do* result in a good regression model, so the predicted height is found by substituting the value of $x = 29$ cm into the regression equation.

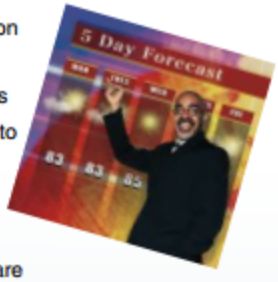
(a) Bad Model: Use $\bar{y}$ for Predictions

Use the 5 pairs of sample data from Table 10-1 to predict the height of someone with a shoe print length of 29 cm:

(b) Good Model: Use the Regression Equation for Predictions

Use the 40 pairs of sample data from Data Set 2 in Appendix B to predict the height of someone with a shoe print length of 29 cm:

1° Forecast Error = $1 Billion



The prediction of forecast temperatures might seem to be an inexact science, but many companies are working feverishly to obtain more accurate predictions. *USA Today* reporter Del Jones wrote that we could save $1 billion in a year if we could forecast temperatures more accurately by just 1 degree Fahrenheit. Jones reported that for the region served by the Tennessee Valley Authority, forecast temperatures have been off by about 2.35 degrees, and that error is common for forecasts in the United States. He states that reducing the 2.35 degree error to 1.35 degrees would save the TVA an estimated $100,000 every day. Forecast temperatures are used to determine the allocation of power from generators, nuclear plants, hydroelectric plants, coal, natural gas, and wind. Statistical forecasting techniques are now being refined so that we can all benefit from savings of money and natural resources.