Writing Models

We will spend a considerable amount of time learning how to mathematically model data sets. You will learn that modeling requires you to take a mathematical equation and incorporate it into a sentence that would allow any reader to use the model, without additional information. To this end, when we are asked to model we report our models in sentence form and avoid using mathematical terminology.

The table below shows the enrollment for a university in the southeast from 1965 through 1969.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Thousand Students</td>
<td>5.024</td>
<td>5.54</td>
<td>6.057</td>
<td>6.525</td>
<td>7.028</td>
</tr>
</tbody>
</table>

The linear equation used to model this data when the input is aligned to the number of years after 1960 is \( S(x) = 0.4993x + 2.5397 \) thousand students.

There are several correct ways to report a model for this data. Each of the models shown below contains the following elements combined in sentence form:

1. An equation (implies left and right hand side with equality)
2. A description* of the output including units.
3. A description of the input including units.
4. An indication of the interval of input values over which the model is defined. This can be given in words or as an interval using inequalities. This interval is required whenever a model is created from a data set.

Possibility #1: The enrollment for a university in the southeast from 1965 through 1969 is modeled by \( S(x) = 0.4993x + 2.5397 \) thousand students, \( x \) years after 1960.

Possibility #2: \( S(x) = 0.4993x + 2.5397 \) thousand students enrolled in a university in the southeast from 1965 through 1969, \( x \) years since 1960.

Possibility #3: \( S(x) = 0.4993x + 2.5397 \) thousand students enrolled in a university in the southeast, where \( x \) is the number of years since 1960, \( 5 \leq x \leq 9 \).

*Please note: The text does not always include a description of the output or input interval in the answers in the back of the book. However, whenever a model is given in the text, the output description is included. When we write models, we will always include an output description and input interval.